

LCRA's Water Operations

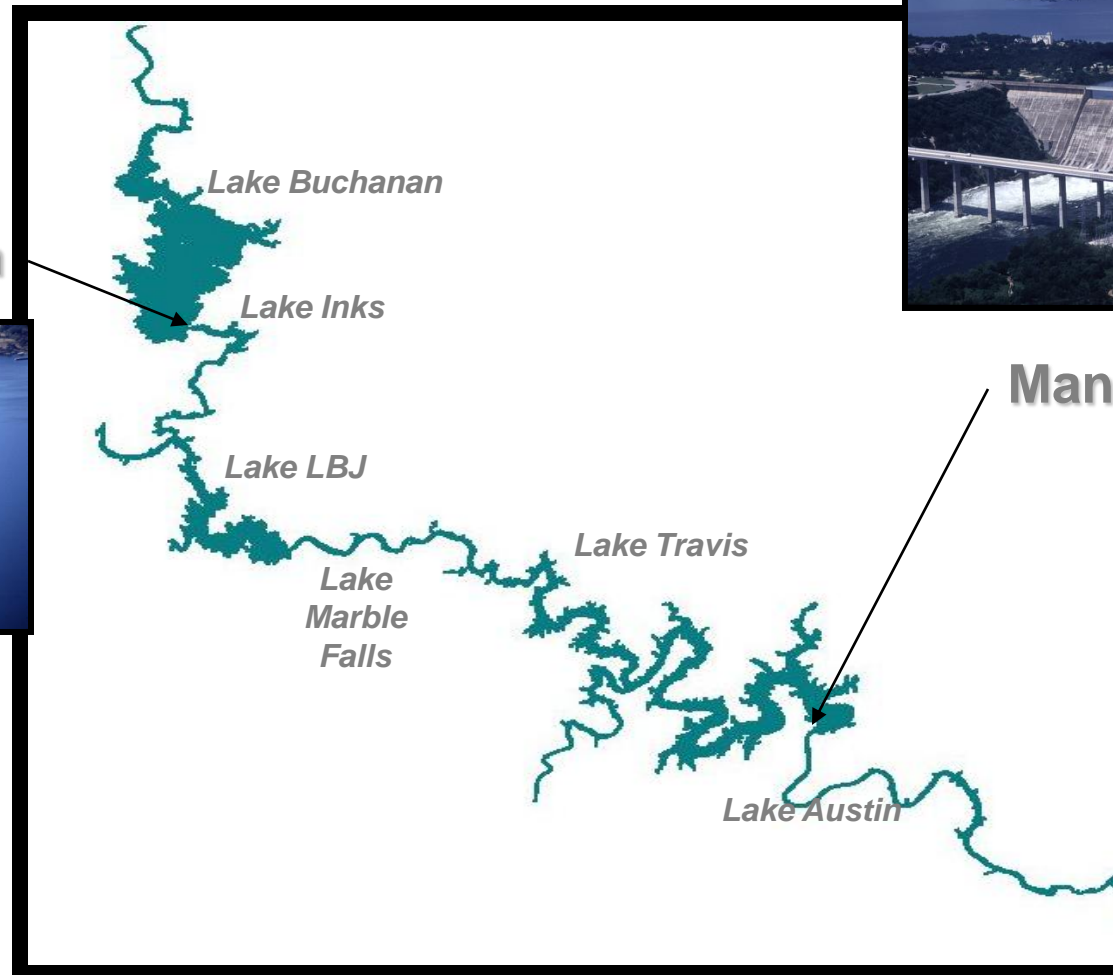


Overview

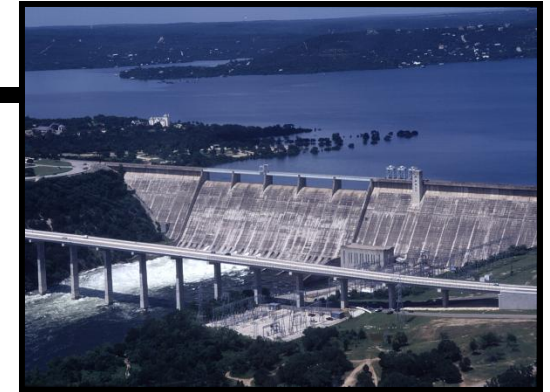
- Highland Lakes water rights
- Water Management Plan
 - Brief explanation
 - Update
- Other LCRA water rights
- Pending Water Rights/Amendments
- Water Supply Resource Plan

LCRA'S HIGHLAND LAKES WATER RIGHTS

Lakes Buchanan & Travis

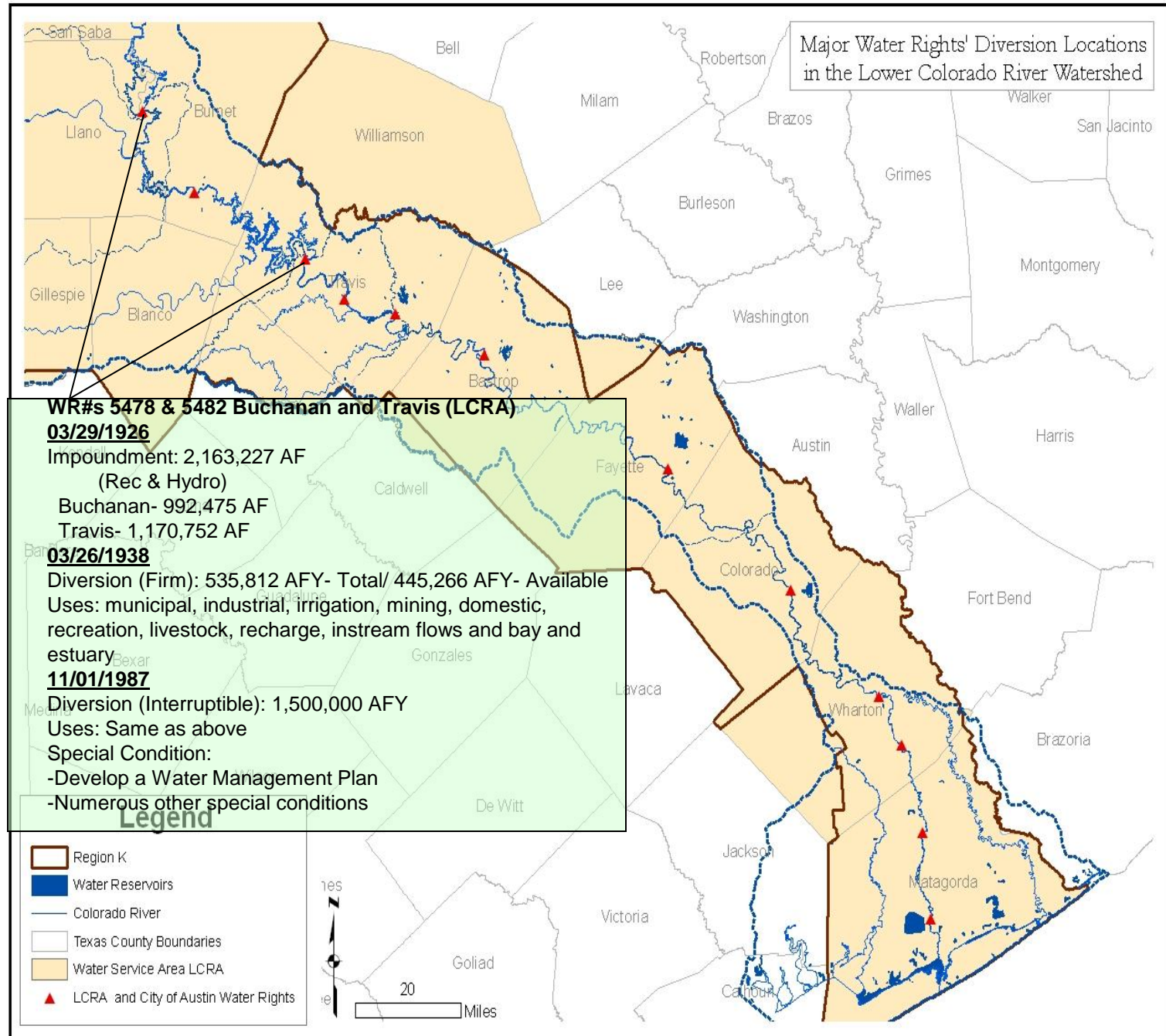


Buchanan Dam

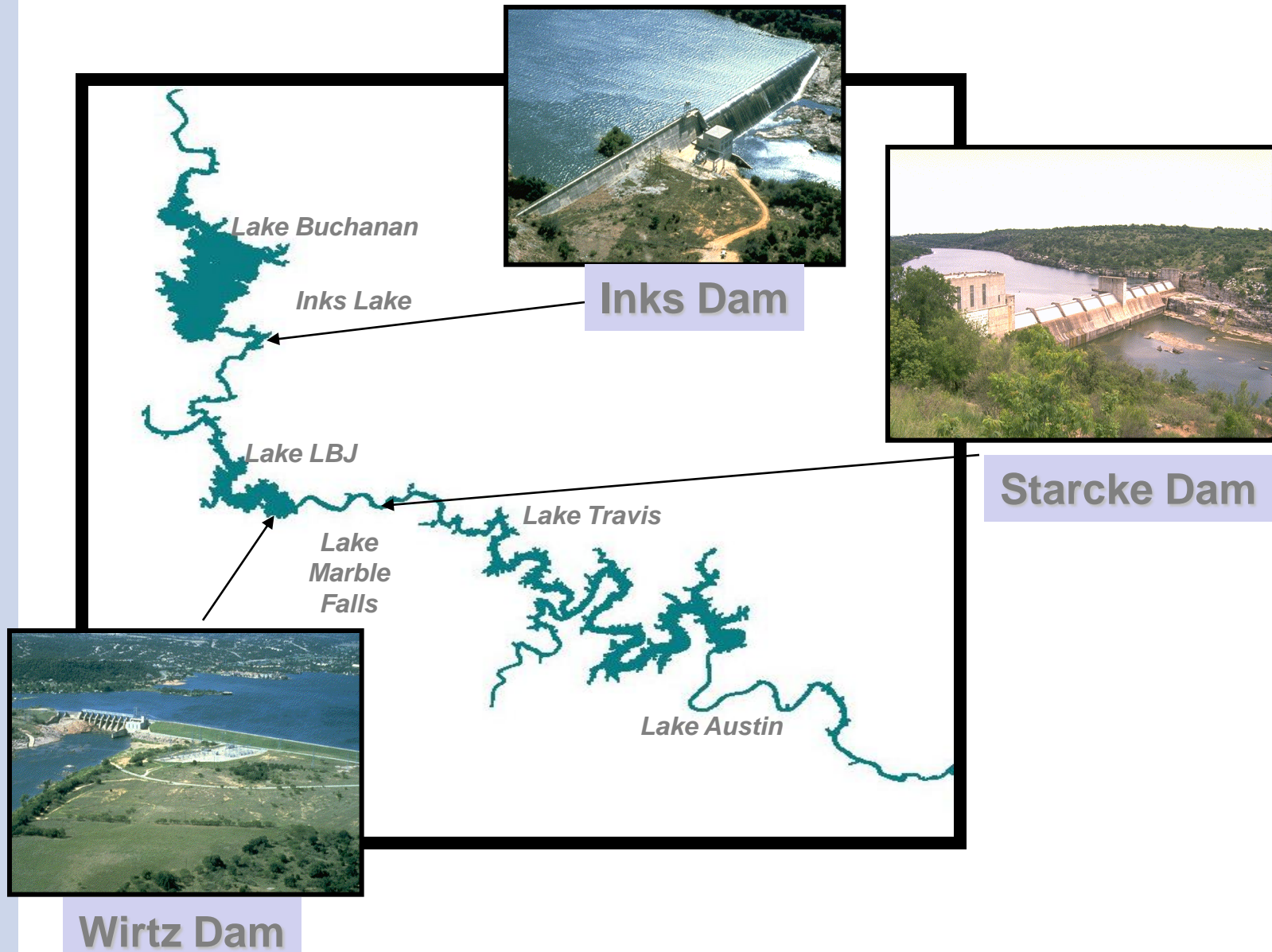


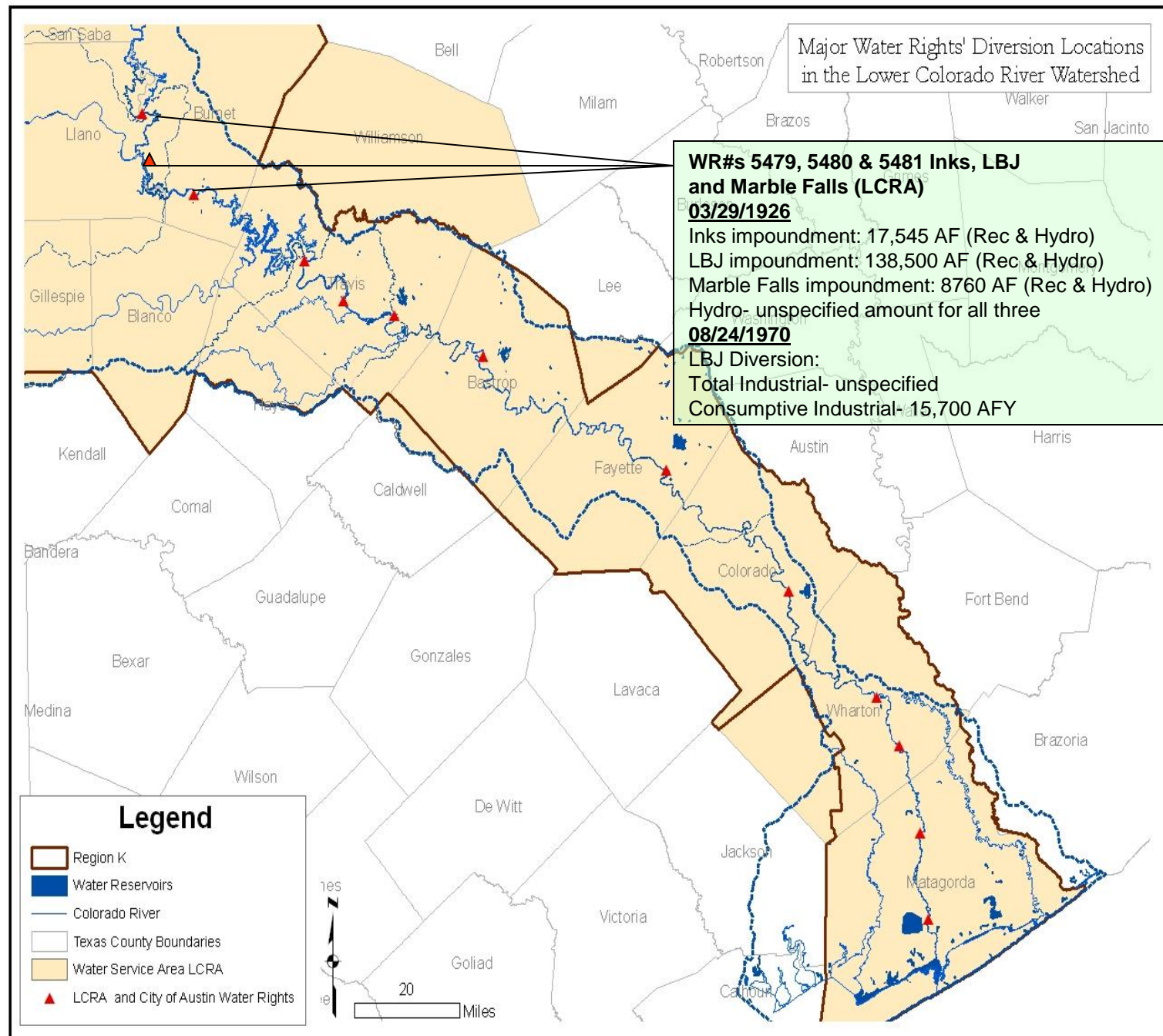
Mansfield Dam

Major Water Rights' Diversion Locations in the Lower Colorado River Watershed



Intermediate Lakes

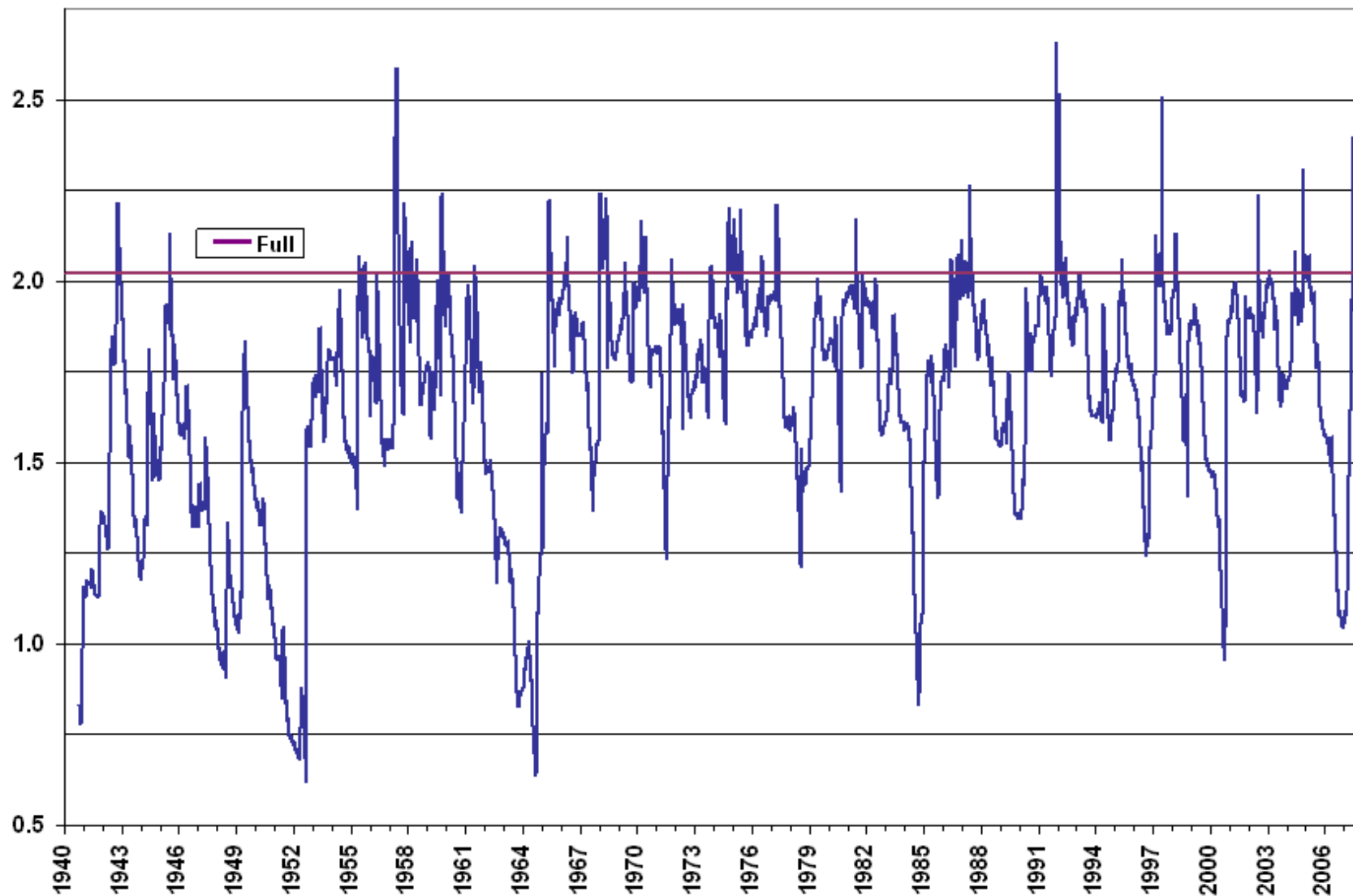




Historic Look At Combined Storage in Lakes Buchanan and Travis

Highland Lakes - Combined Storage

(Million Acre-Feet)



LCRA's Water Management Plan



- First of its kind in the state
- LCRA is only river authority with a comprehensive water management plan requirement

Water Management Plan – What is it?

- Amendment to the water rights for Lakes Buchanan & Travis
- **Determines day-to-day operation of Lakes Buchanan & Travis and allocation of downstream inflow**
- **Allows unused portion of firm yield to be used on interruptible basis**
- Developed in 1989 & amended three times
- Any changes proposed must be approved by LCRA Board and TCEQ
- Current TCEQ-approved WMP dated 2010
- **Stakeholder process**

WMP: Key Goals

- Manage Highland Lakes & Colorado River together as a single system for water supply purposes.
- Maximize the beneficial use of water derived from the inflows below the Highland Lakes.
- Stretch and conserve the waters stored in the Highland Lakes.
- Adaptive management approach

WMP: Key Elements

- **Allocate Supply**
 - Sets up allocation procedures and operating policies
 - Quantify annual interruptible supply availability
 - Defines trigger levels for curtailment of interruptible supply
 - Develop guidelines for meeting downstream environmental needs
- **Drought Management Plan**
 - Planning for management through the “Drought-of-record”
 - Establishes criteria for determining drought more severe than “Drought-of-record”

2010 WMP – Curtailment Thresholds

2010 Water Management Plan - Drought Triggers

When water in the lakes is ...	On this date ...	Action prescribed in 2010 Water Management Plan
Lakes Travis and Buchanan are full at 2.011 million acre-feet		
Less than 94 percent full	Jan. 1 or July 1	Interruptible supplies cease for all customers except irrigation operations.
Less than 1.7 million acre-feet	Jan. 1	Environmental releases for bays and estuaries are reduced to meet 150 percent of critical (to the extent of storable inflows).
Less than 1.4 million acre-feet	Jan. 1	Begin gradual curtailment of interruptible supply to irrigation operations. Amount of curtailment increases when water storage levels are lower. Environmental releases for instream flows are reduced to meet critical needs.
Less than 1.1 million acre-feet	Jan. 1	Environmental releases for bays and estuaries are reduced to meet critical needs.
900,000 acre-feet	At any time	Request firm customers to implement mandatory conservation restrictions. Meet with customers to develop curtailment plan should drought worsen.
600,000 acre-feet	At any time	If criteria indicate that drought is worse than the Drought of Record, then begin pro rata curtailment of firm supply after ceasing interruptible supply (timing based on duration of drought).
325,000 acre-feet	Jan. 1	No interruptible supply available.
200,000 acre-feet	At any time	No interruptible supply available.

LCRA encourages its firm water customers to implement long-term, year-round water conservation measures to meet the goals included in their water conservation plans. LCRA has an ongoing public awareness campaign on water use and conservation.

Requirements in 2010 Order

- **Stakeholder process**
 - Allow meaningful participation to achieve regional consensus
 - Include summary of steps taken by LCRA to TCEQ
- **Interruptible curtailment procedures to satisfy projected firm demands should recent intense drought conditions recur**
- **Evaluation of criteria for declaring a drought worse than drought of record**
- **Evaluation of minimum combined storage level necessary to protect firm customers**
- **Incorporation of recent settlements- STPNOC and Austin**
- **Revisions to provisions governing how LCRA provides water to address environmental flows**
 - New studies
 - Provide water to maximum extent reasonable and practicable
- **Begin by July 1, 2010 and submit to TCEQ not later than July 1, 2013.**

Next Update to WMP

- Staff has already started on the process
 - Stakeholder Process
 - 16 members- identify their alternates
 - Firm Water
 - City of Austin; Kingsland WSC; City of Burnet; STPNOC; and Horseshoe Bay Resort
 - Interruptible Customers
 - Garwood; Lakeside; Gulf Coast; and Pierce Ranch
 - Environmental
 - TPWD; Sierra Club; and NWF

LCRA's Water Supplies

LCRA'S OTHER WATER RIGHTS

Major Water Rights' Diversion Locations
in the Lower Colorado River Watershed

WR#s 5473 Lake Bastrop (LCRA)

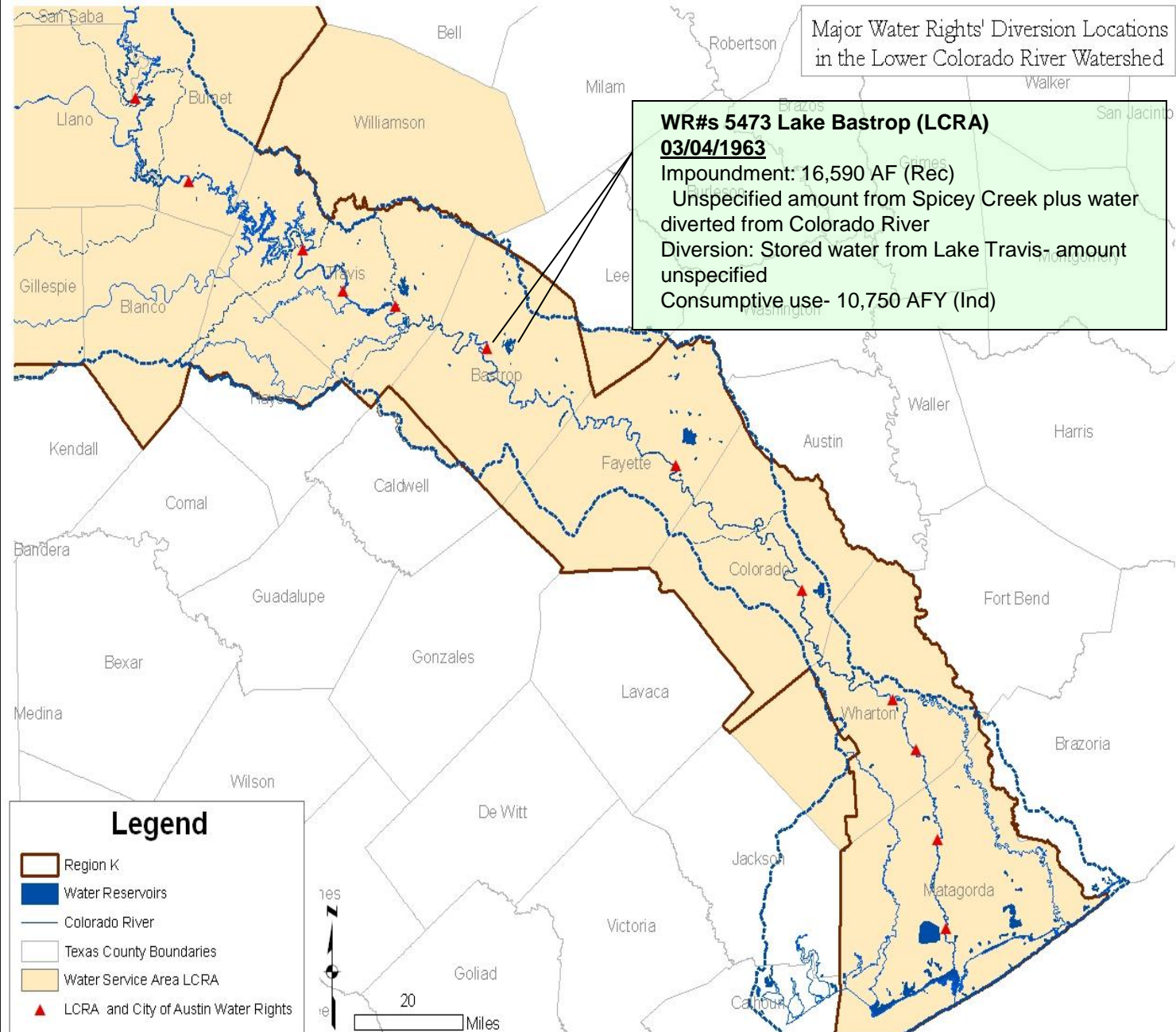
03/04/1963

Impoundment: 16,590 AF (Rec)

Unspecified amount from Spicely Creek plus water
diverted from Colorado River

Diversion: Stored water from Lake Travis- amount
unspecified

Consumptive use- 10,750 AFY (Ind)



Major Water Rights' Diversion Locations in the Lower Colorado River Watershed

WR#s 5474 Fayette Power Project (FPP) (LCRA) 02/03/1975

Impoundment: Comal

Cedar Creek Reservoir- 71,400 AF (Rec & Ind)

Baylor Creek reservoir- 46,600 AF (Rec & Ind)

Diversion: Stored water from lakes Buchanan and Travis

Total industrial diversions- 73,759 AFY

Consumptive industrial use- 38,101 AFY

Term: 09/18/2015

Special conditions:

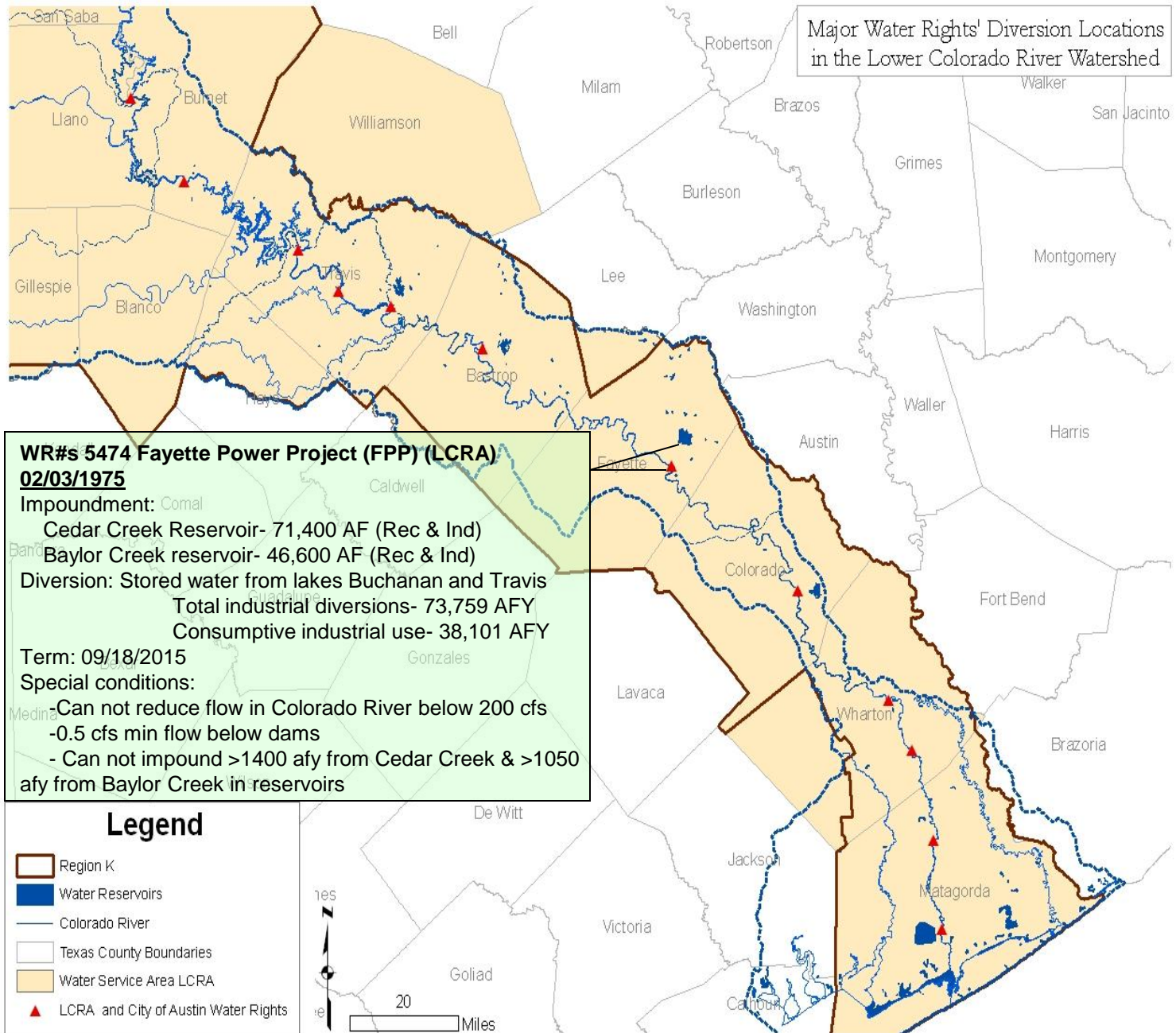
- Can not reduce flow in Colorado River below 200 cfs
- 0.5 cfs min flow below dams
- Can not impound >1400 afy from Cedar Creek & >1050 afy from Baylor Creek in reservoirs

Legend

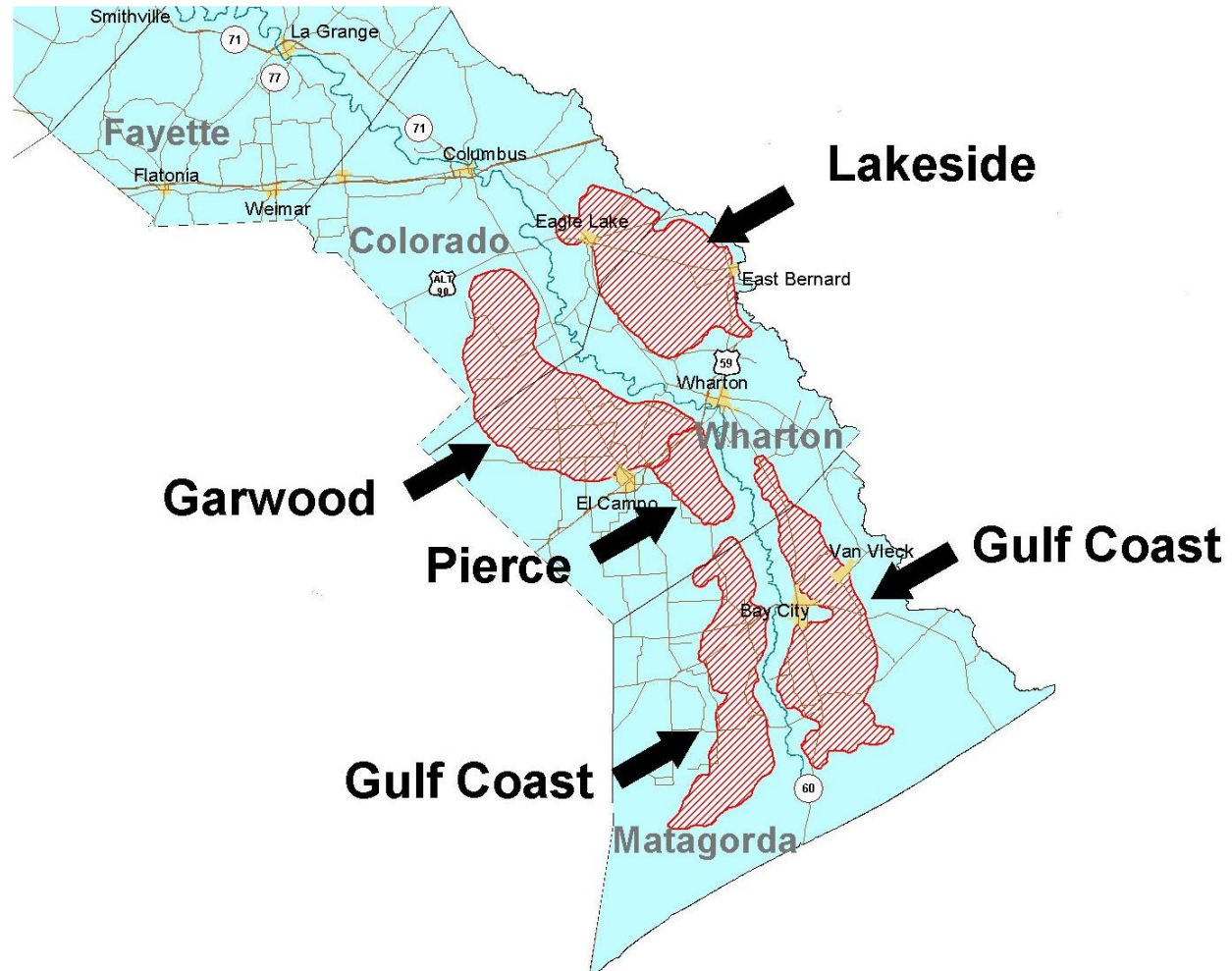
- Region K
- Water Reservoirs
- Colorado River
- Texas County Boundaries
- Water Service Area LCRA
- LCRA and City of Austin Water Rights



20
Miles



Irrigation Operations Served by LCRA



Major Water Rights' Diversion Locations
in the Lower Colorado River Watershed

WR#s 5475 (as amended) Lakeside (LCRA)

01/04/1901

Impoundment: Eagle Lake: 9600 AF

Diversion: Irrigation 52,500 AF

09/01/1907

Diversion: Irrigation & Municipal* 55,000 AFY

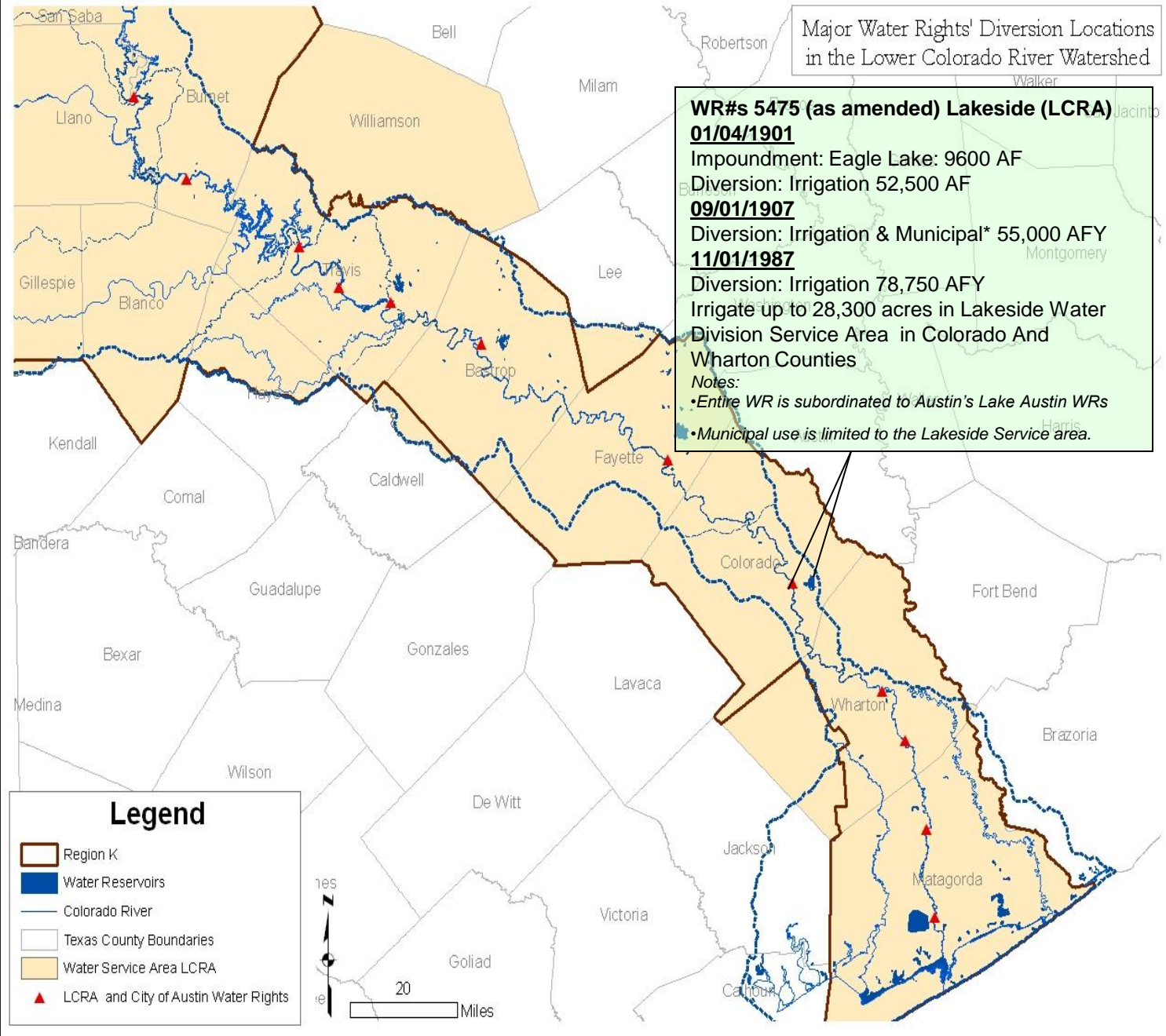
11/01/1987

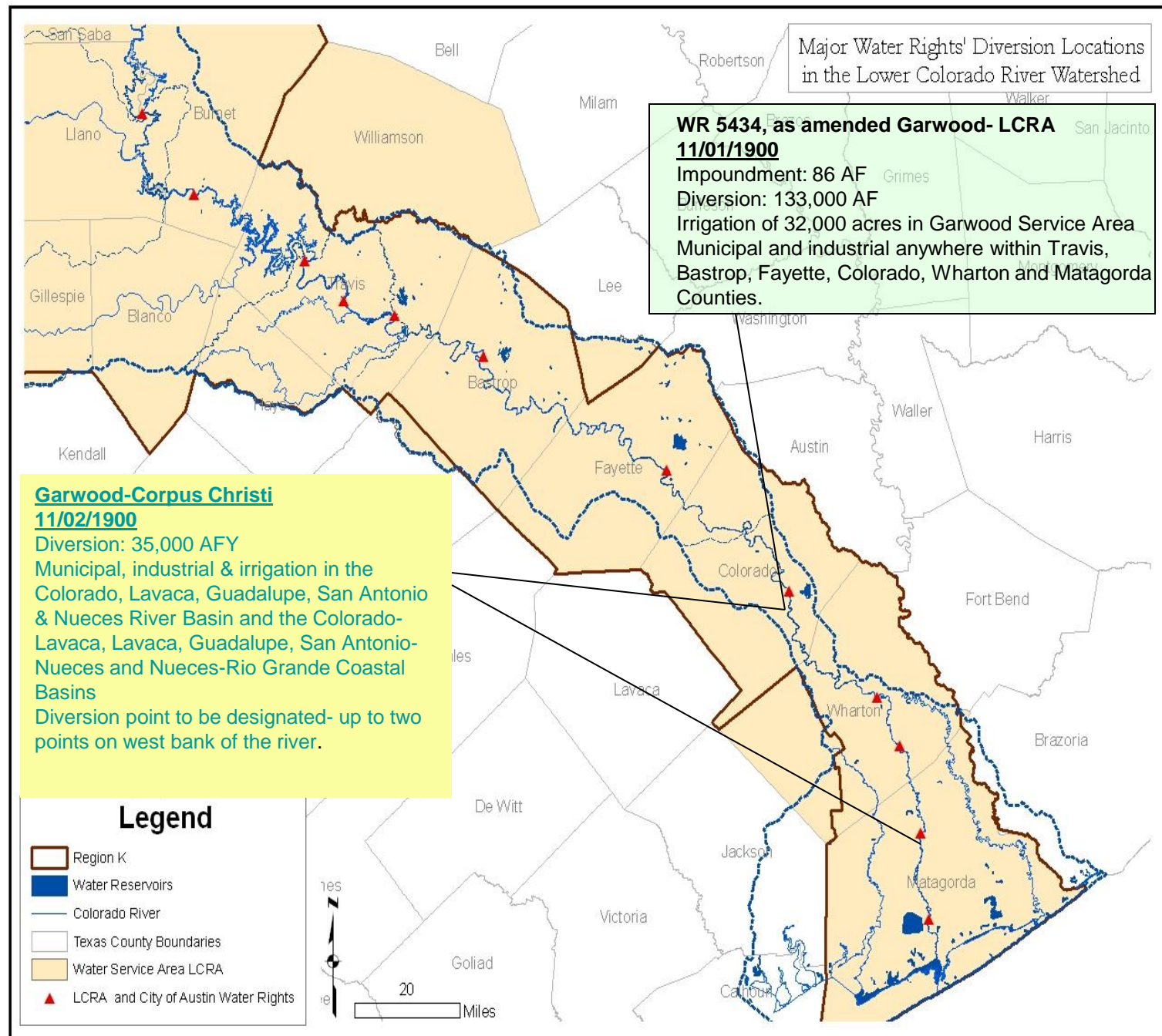
Diversion: Irrigation 78,750 AFY

Irrigate up to 28,300 acres in Lakeside Water
Division Service Area in Colorado And
Wharton Counties

Notes:

- Entire WR is subordinated to Austin's Lake Austin WRs
- Municipal use is limited to the Lakeside Service area.





Major Water Rights' Diversion Locations in the Lower Colorado River Watershed

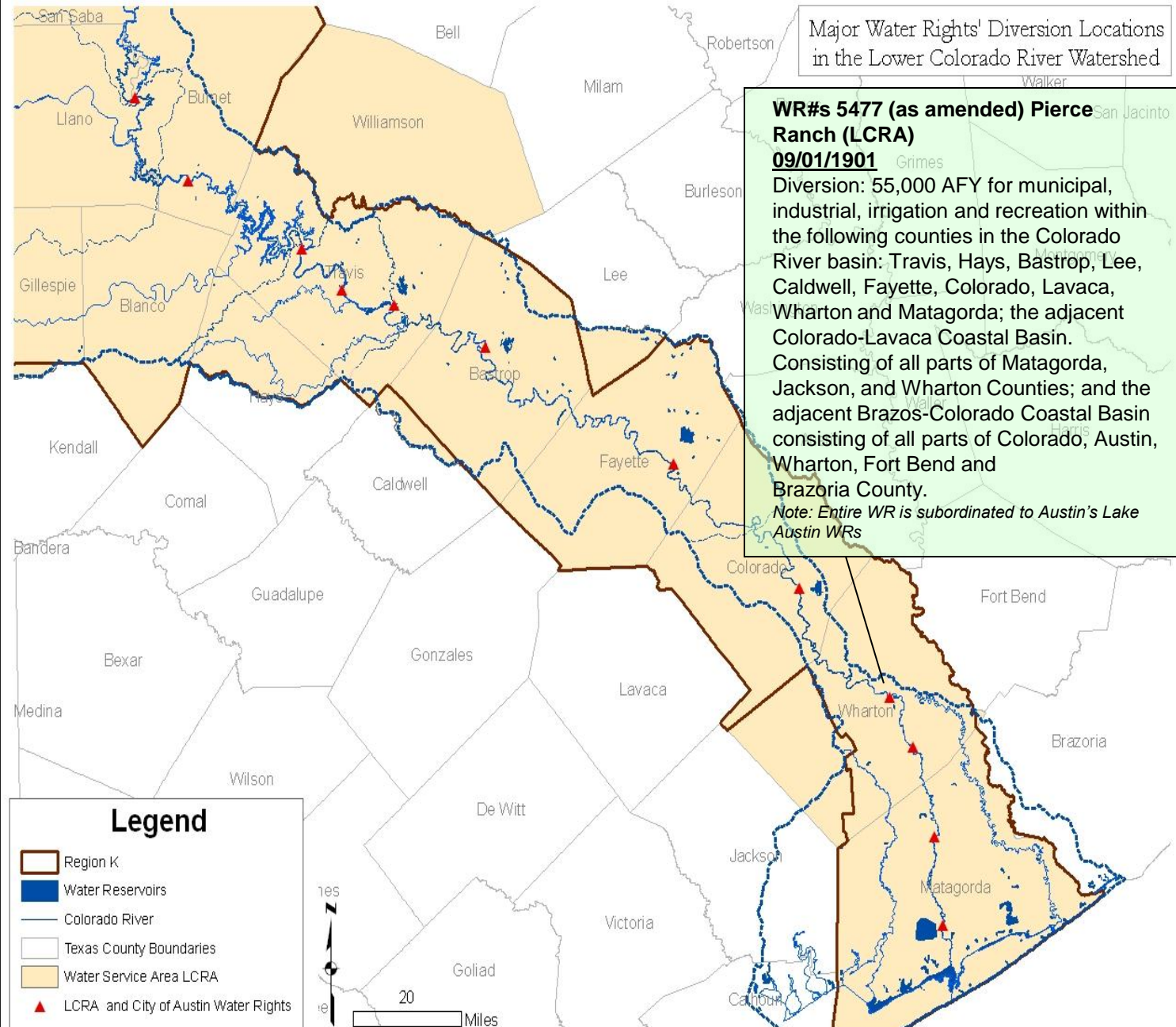
WR#s 5477 (as amended) Pierce Ranch (LCRA)

09/01/1901

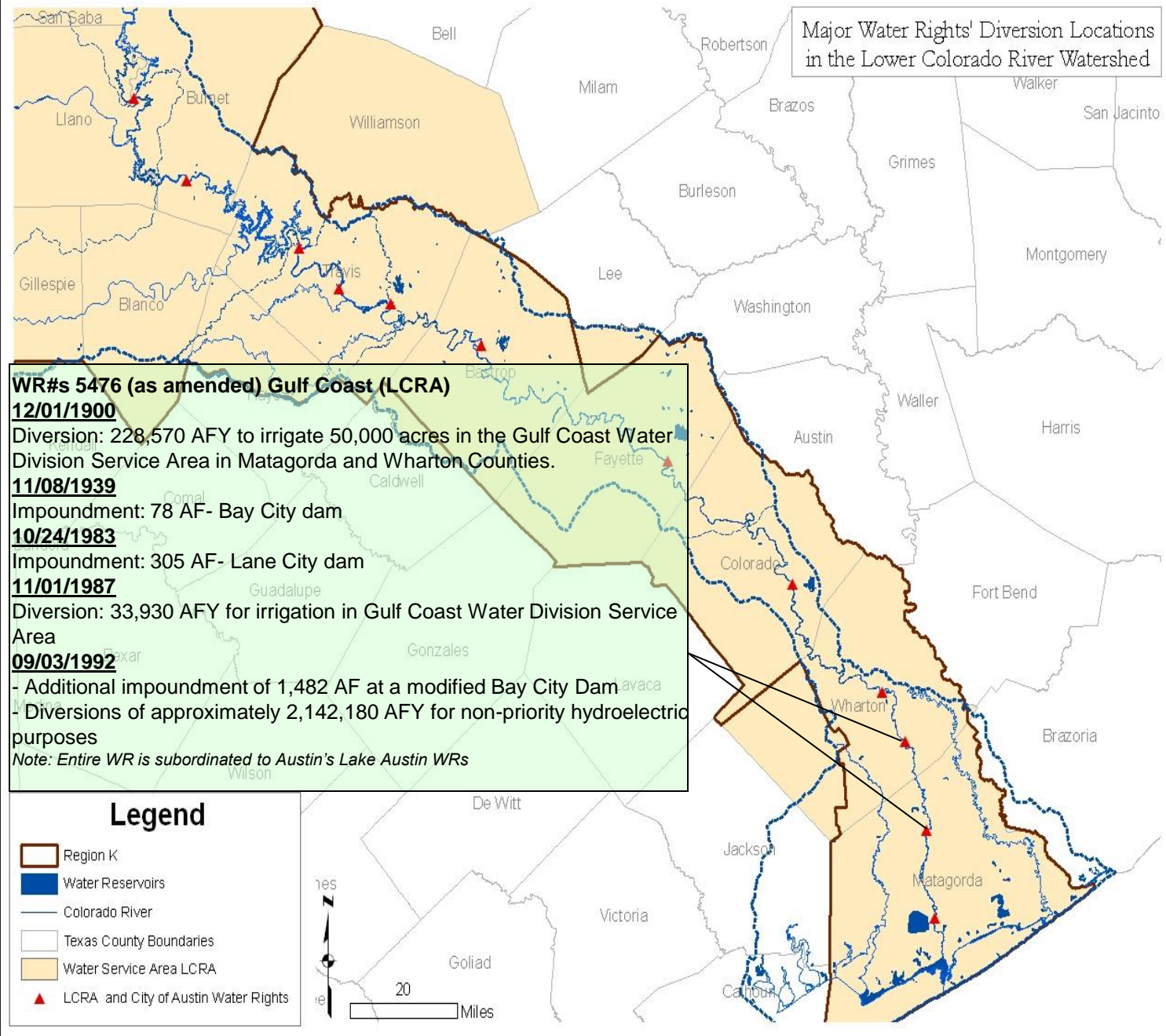
Diversion: 55,000 AFY for municipal, industrial, irrigation and recreation within the following counties in the Colorado River basin: Travis, Hays, Bastrop, Lee, Caldwell, Fayette, Colorado, Lavaca, Wharton and Matagorda; the adjacent Colorado-Lavaca Coastal Basin.

Consisting of all parts of Matagorda, Jackson, and Wharton Counties; and the adjacent Brazos-Colorado Coastal Basin consisting of all parts of Colorado, Austin, Wharton, Fort Bend and Brazoria County.

Note: Entire WR is subordinated to Austin's Lake Austin WRs



Major Water Rights' Diversion Locations
in the Lower Colorado River Watershed



Major Water Rights' Diversion Locations in the Lower Colorado River Watershed

WR#s 5437 LCRA & STPNOC

06/10/1974

Impoundment: 202,600 AF (Primary) & 342 AF (Secondary) reservoirs (STPNOC)

Diversion: 102,000 AFY from Colorado River for industrial; 80,125 AFY consumptive use (LCRA)

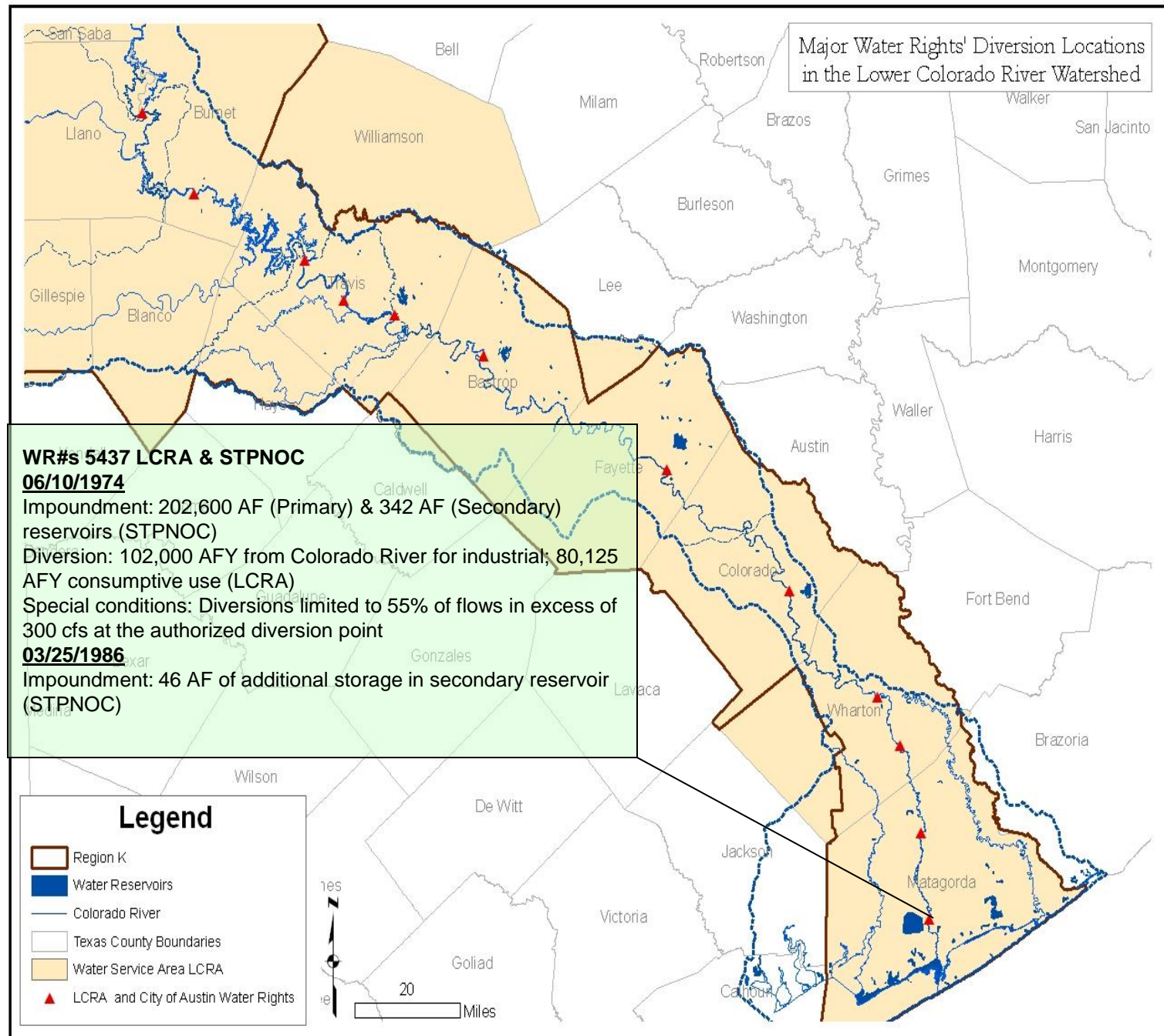
Special conditions: Diversions limited to 55% of flows in excess of 300 cfs at the authorized diversion point

03/25/1986

Impoundment: 46 AF of additional storage in secondary reservoir (STPNOC)

Legend

-  Region K
-  Water Reservoirs
-  Colorado River
-  Texas County Boundaries
-  Water Service Area LCRA
-  LCRA and City of Austin Water Rights



LCRA'S PENDING WATER RIGHTS and WATER RIGHT AMENDMENTS

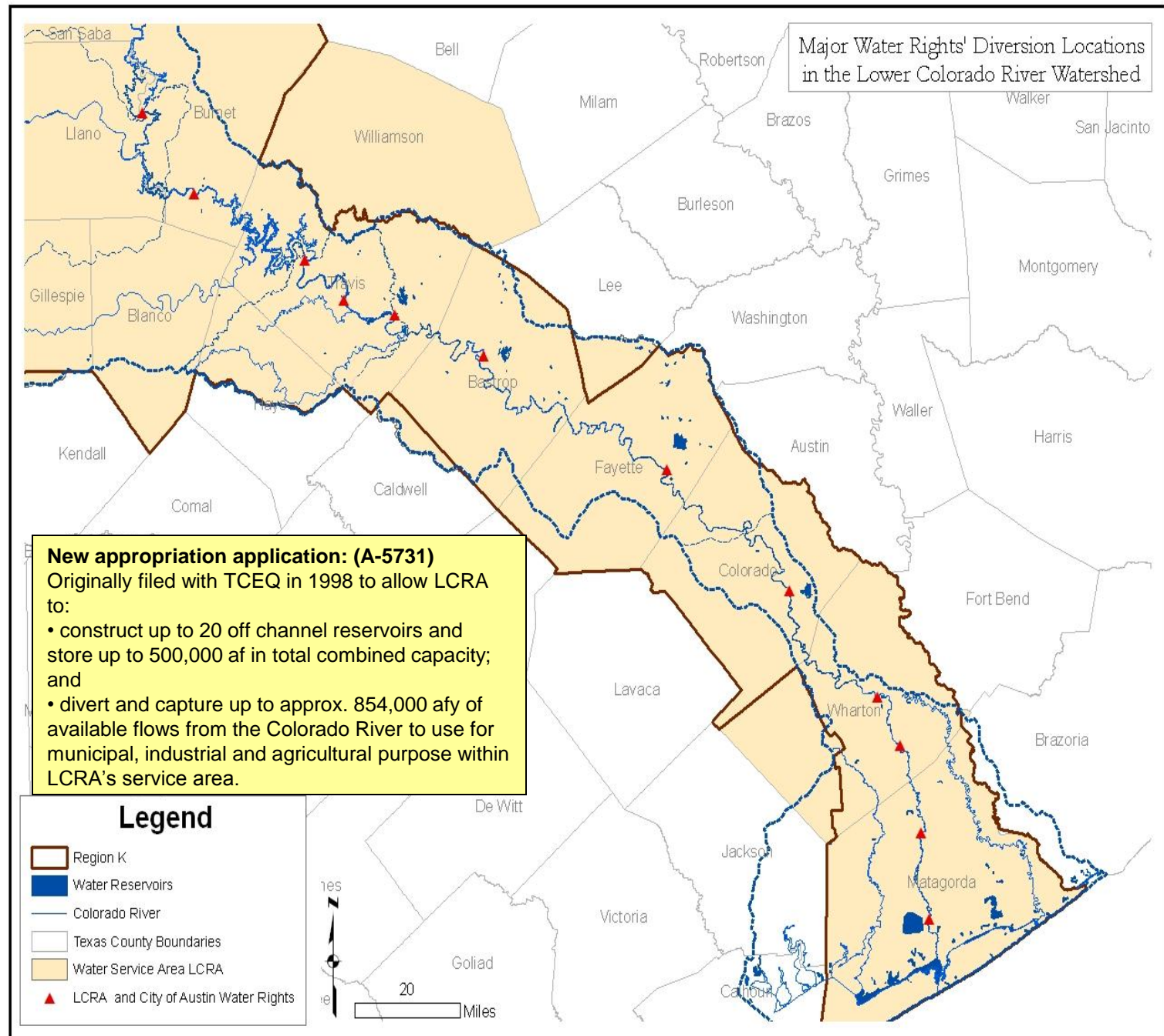
Major Water Rights' Diversion Locations in the Lower Colorado River Watershed

New appropriation application: (A-5731)
Originally filed with TCEQ in 1998 to allow LCRA to:

- construct up to 20 off channel reservoirs and store up to 500,000 af in total combined capacity; and
- divert and capture up to approx. 854,000 afy of available flows from the Colorado River to use for municipal, industrial and agricultural purpose within LCRA's service area.

Legend

-  Region K
-  Water Reservoirs
-  Colorado River
-  Texas County Boundaries
-  Water Service Area LCRA
-  LCRA and City of Austin Water Rights



Major Water Rights' Diversion Locations in the Lower Colorado River Watershed

Amend WR#5677 Leander IBT

Filed with TCEQ in Oct 2007 to allow LCRA:

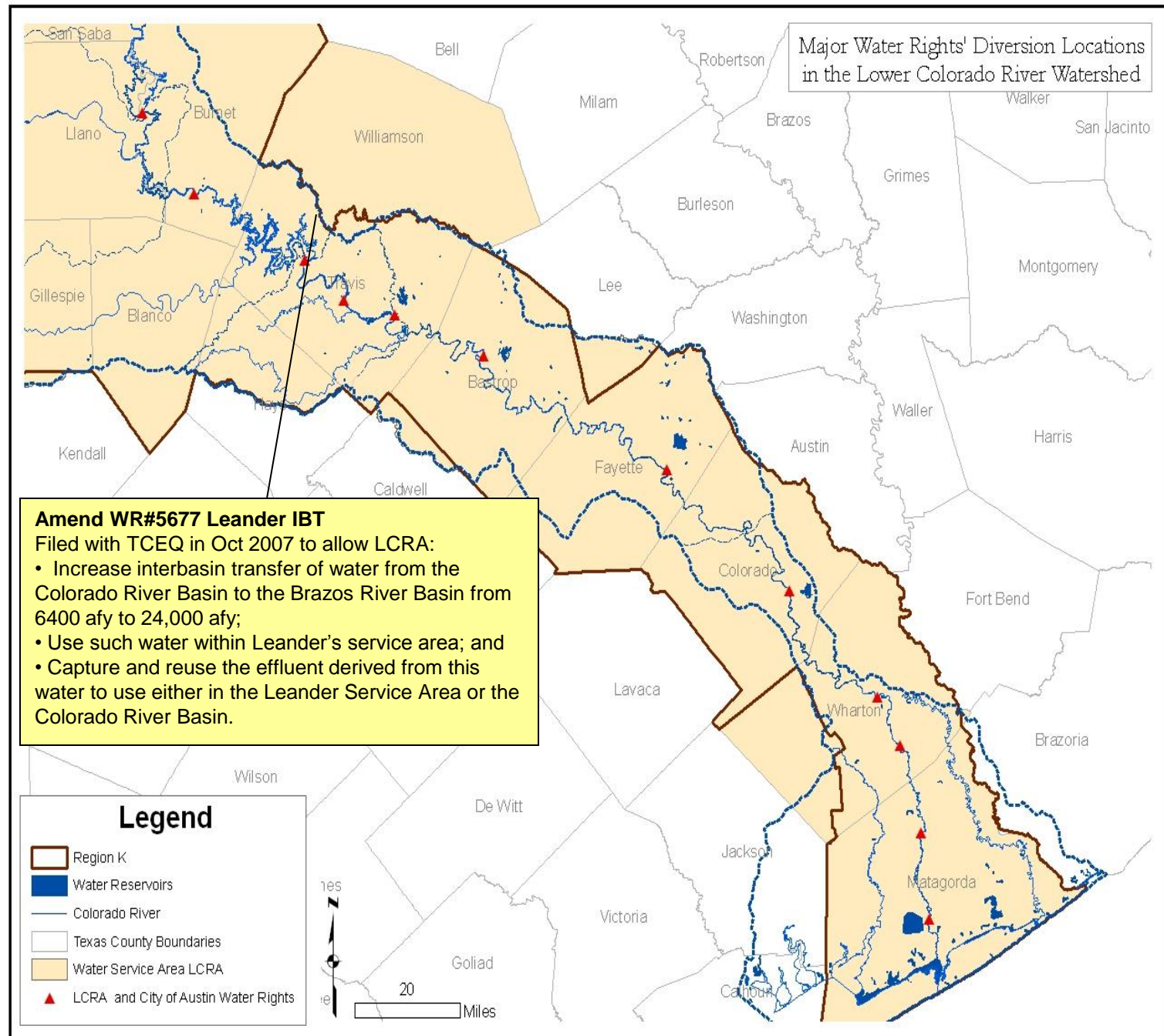
- Increase interbasin transfer of water from the Colorado River Basin to the Brazos River Basin from 6400 afy to 24,000 afy;
- Use such water within Leander's service area; and
- Capture and reuse the effluent derived from this water to use either in the Leander Service Area or the Colorado River Basin.

Legend

- Region K
- Water Reservoirs
- Colorado River
- Texas County Boundaries
- Water Service Area LCRA
- LCRA and City of Austin Water Rights



20
Miles



Major Water Rights' Diversion Locations
in the Lower Colorado River Watershed

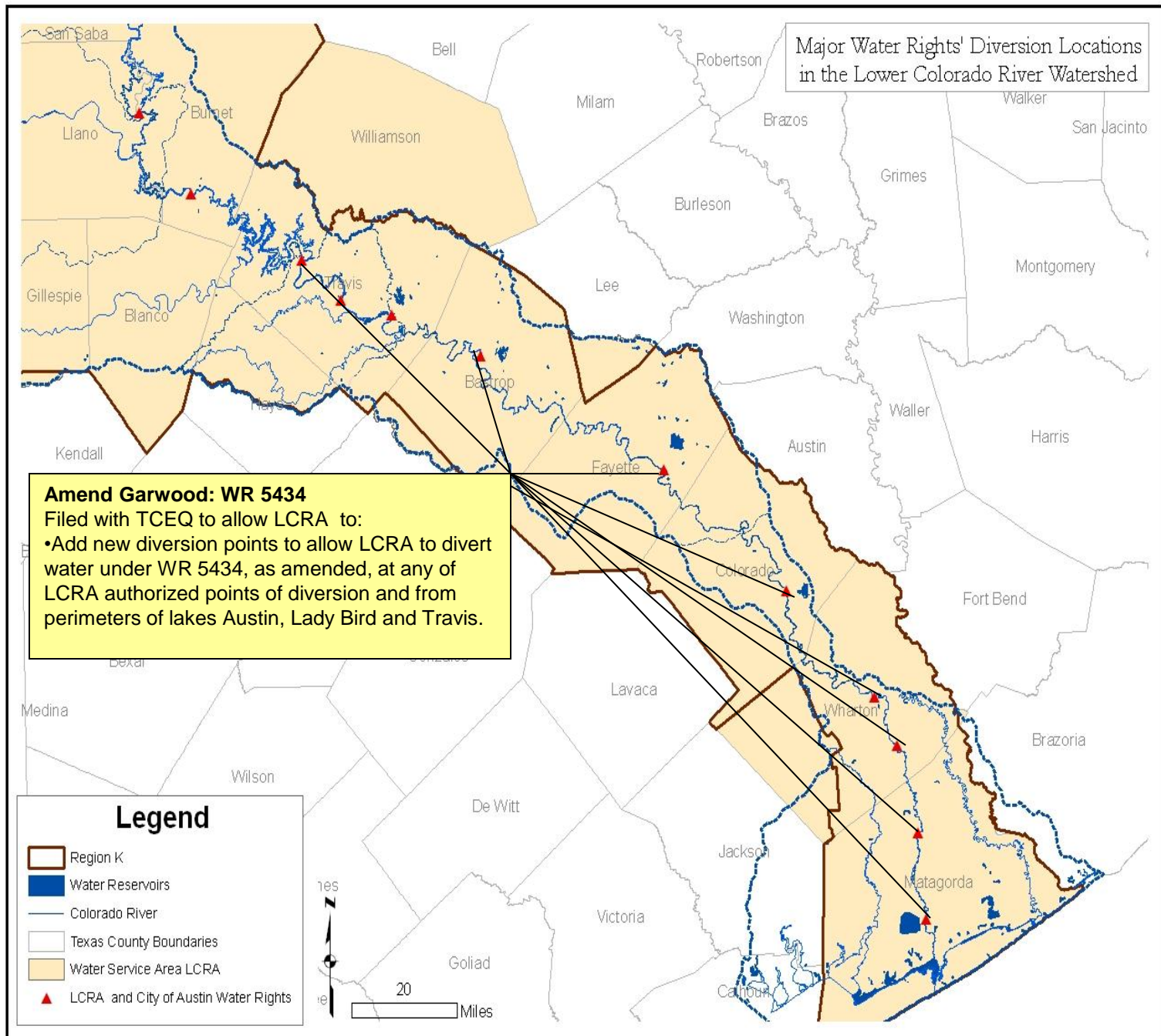
Amend Garwood: WR 5434

Filed with TCEQ to allow LCRA to:

- Add new diversion points to allow LCRA to divert water under WR 5434, as amended, at any of LCRA authorized points of diversion and from perimeters of lakes Austin, Lady Bird and Travis.

Legend

- Region K
- Water Reservoirs
- Colorado River
- Texas County Boundaries
- Water Service Area LCRA
- LCRA and City of Austin Water Rights



Future Water Rights/Amendments

- Indirect Reuse application with Austin
- Future WMP amendment

LCRA's Water Supplies

LCRA'S WATER SUPPLY RESOURCE PLAN

Water Supply Resource Plan

The Water Supply Resource Plan (WSRP) is LCRA's roadmap to:

- Meet future water needs
- Where these needs will be
- When those needs will be met
- Potential cost



WMP vs WSRP

- WSRP
 - Roadmap on how LCRA will develop new water supplies
 - Strategies to meet future demands
 - Not an operating plan
- WMP
 - Required by water rights
 - Deals with only the water supplies from lakes Buchanan and Travis
 - Dictates how LCRA will operate Buchanan and Travis
 - In essence a reservoir operations plan

Water Supply Resource Plan

Demands
versus
Supplies

- Projected demands
 - LCRA will need over 670,000 afy in firm water supplies in 2100
- Existing supplies
 - Estimated to supply about 600,000 afy in 2100

Water Supply Resource Plan

PUBLIC INPUT

- Public input
 - public meetings; and
 - online survey.
- Public identified over 180 potential water supply options
 1. Conservation
 2. Desalination
 3. Wastewater reuse
- Public shared over 150 priorities that they had in planning for new supplies
 1. Clean water, protect environment
 2. Recreation, lifestyle
 3. Availability

Water Supply Resource Plan

Developed
Three
Strategies

Strategy I-
Use LCRA's
Existing
Supplies

Amend LCRA's Existing Water Rights
Cost: about \$5 mil

Water Supply Resource Plan

Strategy II:
Existing
Supplies and
Conserve for
our Future

- Enhanced M&I conservation- \$225 mil
 - Conserve about 80,000 afy in municipal and industrial use
- Enhanced M&I conservation plus agricultural conservation- \$450-525 mil
 - Conserve another 118,000 afy in ag use
- Enhanced M&I conservation plus direct wastewater reuse- \$325 mil
 - Conserve another 70,000 afy

Water Supply Resource Plan

- Current conservation plus off-channel reservoir- \$880 mil
 - Conserve about 40,000 afy in municipal and industrial use
 - Build downstream off-channel reservoir(s) to help meet downstream firm water needs
- CB-2: Current conservation plus off-channel reservoir and pipeline- \$1.6 bil
 - Add a pipeline from off-channel reservoir(s) to Austin area to satisfy about 75,000 afy need

Strategy III:
Using
Existing
Supplies,
Conserving
and Building
for our Future

Water Supply Resource Plan

Strategy III Continued

- Current conservation plus brackish desal and aquifer storage and retrieval (ASR) \$721 mil
 - Add brackish desal of 33,600 afy in Matagorda Co. to supplement industrial needs
 - Add ASR facility in Bastrop Co. of 22,400 afy with pipeline to Travis County
- Current conservation plus importing groundwater- \$1.4 bil
 - Import 35,000 afy of groundwater to Travis Co.

Water Supply Resource Plan

**Approved
by the
LCRA
Board
October
2010**

Where you can see the WSRP?

http://www.lcra.org/library/media/public/docs/water/wsrp/wsrp_finalplan_oct2010.pdf

Questions?



**How much water is contracted for or
otherwise committed?**

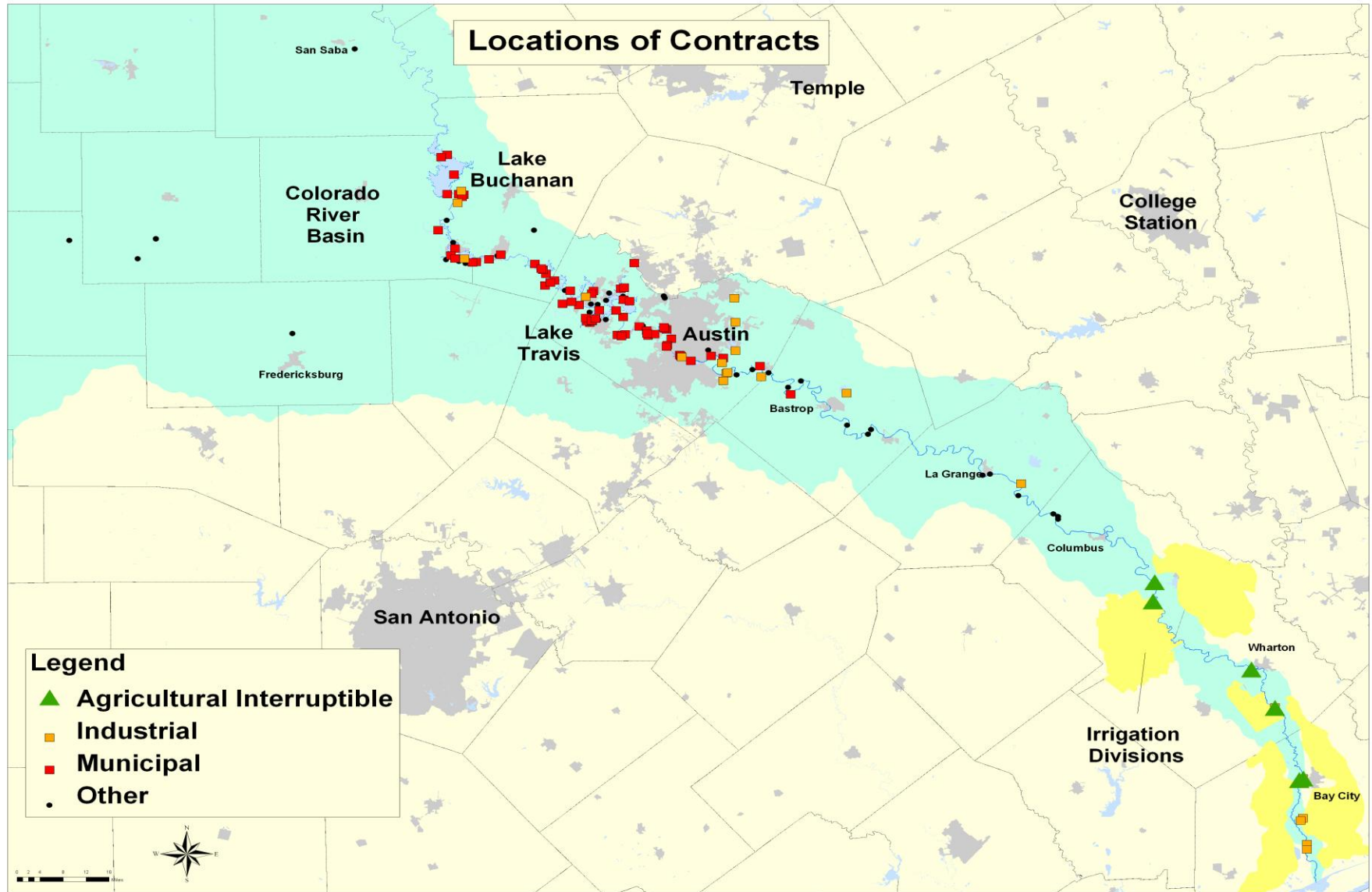
Current Commitments

January 2009 Board Operations Report	Firm Water (in acre-feet/year)	
Total Contracts/Commitments:		457,986
City of Austin-Estimated backup water supply to City's water rights	138,560	
LCRA Power Plants- Board Commitment	66,601	
South Texas Project Nuclear Operating Co.	40,000	
Brazos River Authority	25,000	
Leander	24,000	
Cedar Park	18,000	
Pflugerville	12,000	
LCRA Water Utilities- Board Commitment	12,078	
Other Contracts	88,307	
Environmental Reservation- Board Commitment	33,440	
LCRA Board Reservation in WMP for Future Use		50,000
Total Commitments and Reservations		507,986

See Handout

**Where are our customers using water?
How much is being used?**

Locations of LCRA Contracts

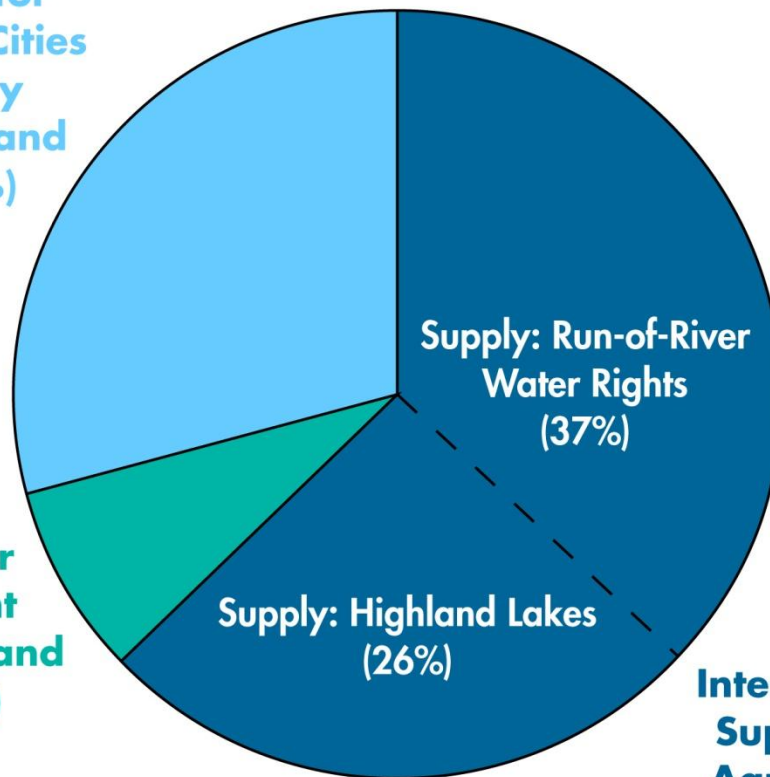


Water use today

2006 Total LCRA Water Use 492,768 acre-feet per year

**Firm Supply for
Communities, Cities
and Industry
Supply: Highland
Lakes (29%)**

**Releases for
Environment
Supply: Highland
Lakes (8%)**

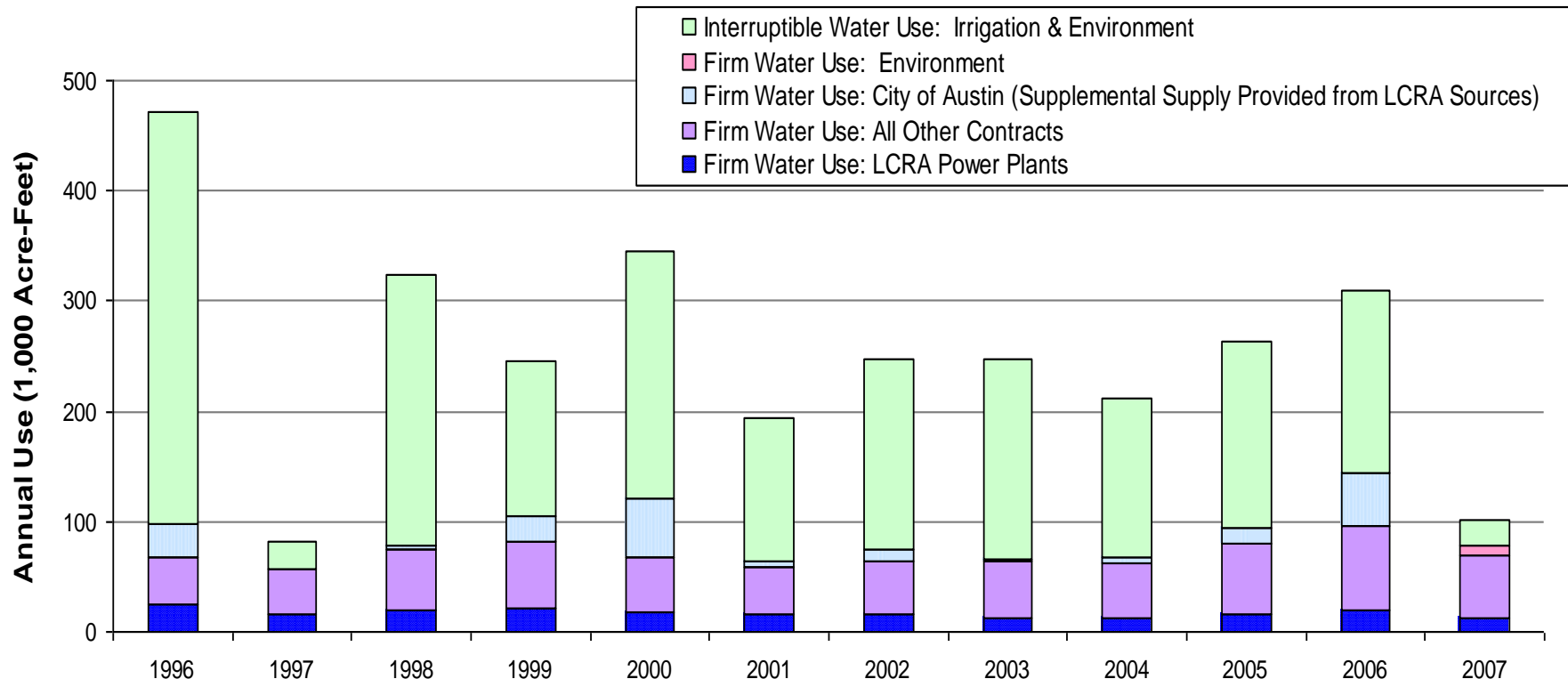


**Supply: Highland Lakes
(26%)**

**Interruptible
Supply for
Agriculture
(63%)**

Water Being Used from Lakes

Total Water Use from Lakes Buchanan and Travis, 1996 - 2007 *

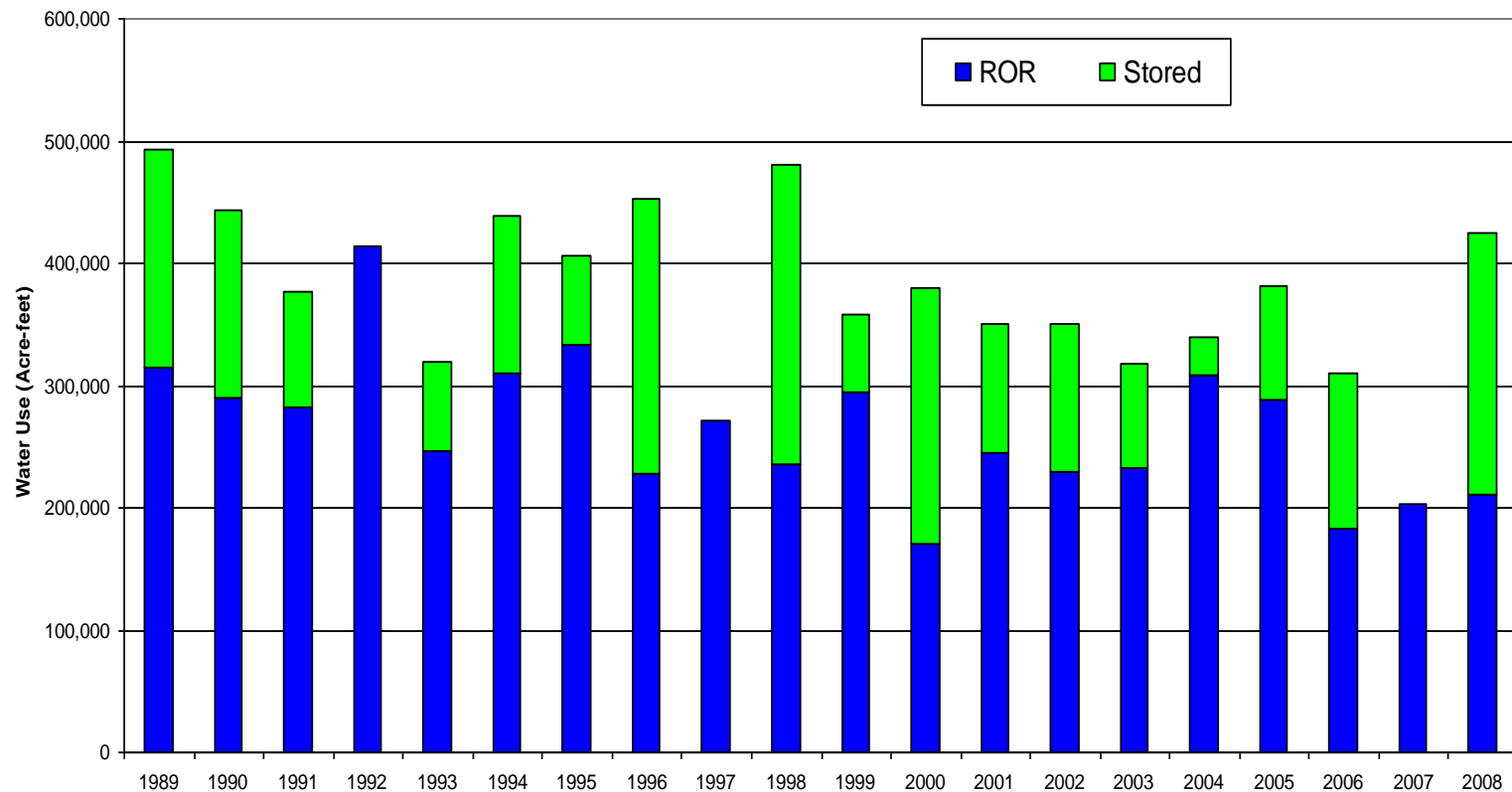


* In addition to providing firm water supply from Lakes Buchanan & Travis, LCRA also provides interruptible stored water supply for irrigation and for meeting environmental flow needs

Historic Irrigation Water Use

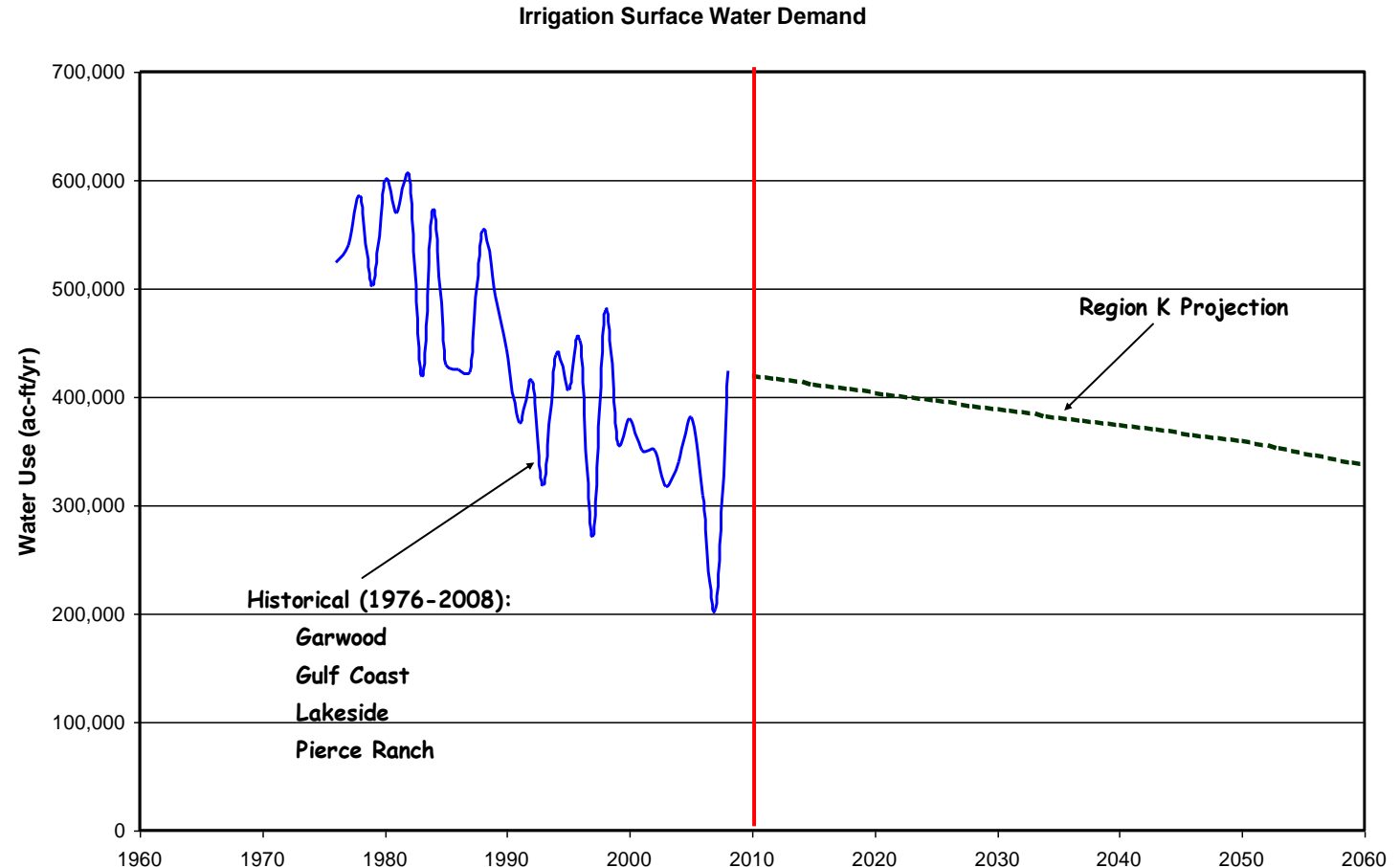
Amounts
and Sources
of Water for
Irrigation
Operations
(1989-2008)

Diversions by the Four Downstream Irrigation Operations 1989 - 2008



- Irrigation dependant on interruptible stored water

Historic Irrigation Water Use



- Irrigation use has declined
- Reduced acreage and improved efficiency
- Staff using Region K's projections

Questions?



LCRA's Water Management Plan

***LCRA's Basis
for Operations
of Lakes Buchanan and Travis***

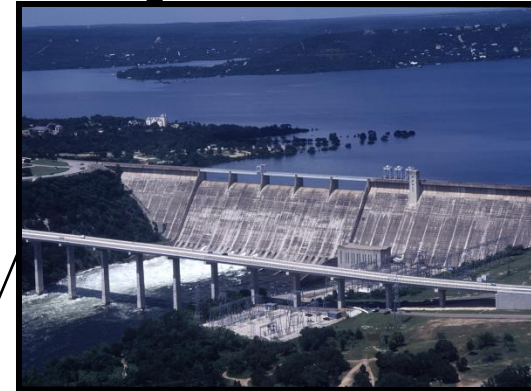
The Highland Lakes and Dams



Buchanan Dam



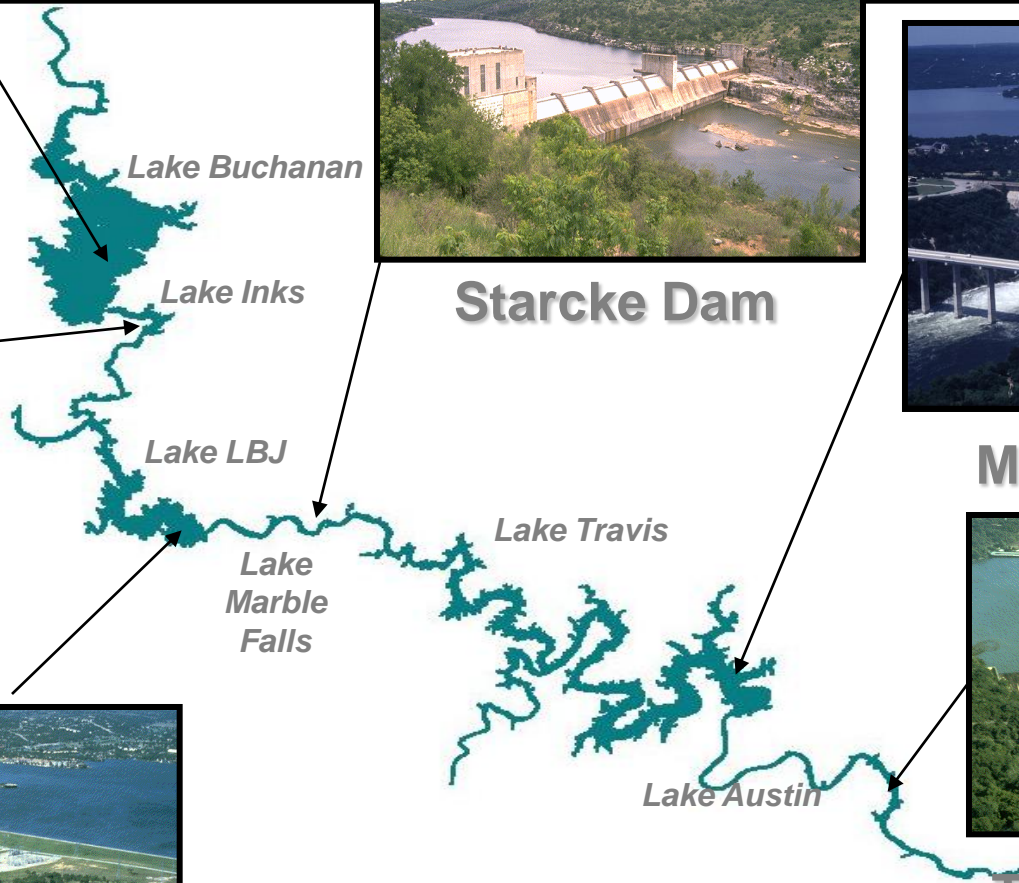
Starcke Dam



Mansfield Dam



Tom Miller Dam



Lake Buchanan

Lake Inks

Lake LBJ

*Lake
Marble
Falls*

Lake Travis

Lake Austin



Inks Dam

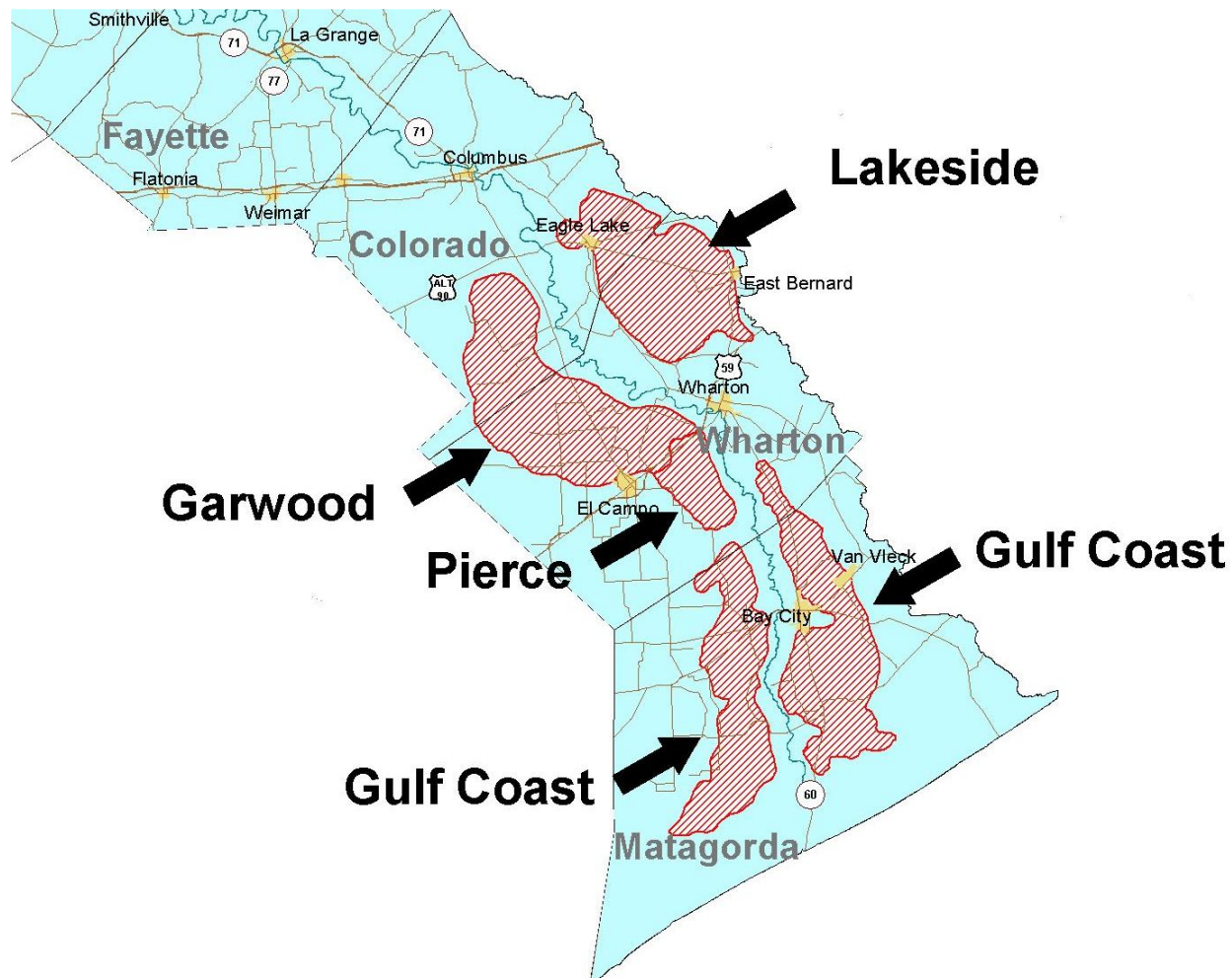


Wirtz Dam

Highland Lakes Water Rights

- **Buchanan and Travis are multipurpose**
 - Water supply, hydro, flood control, recreation & other uses
- **LBJ is used for industrial, hydro & recreation**
- Other lakes used for hydro & recreation
- **Travis only designated flood control reservoir**
 - Agreement with FEMA to lower Lake Buchanan level during summer hurricane season by 2 ft
- **“Constant-level” reservoirs**
 - Inks, LBJ, Marble Falls, and Lake Austin pass-thru lakes
 - levels generally maintained within “operating range”
 - LCRA only maintains and operates Tom Miller Dam (owned by City of Austin)

Irrigation Operations Served by LCRA



LCRA's Downstream Water Rights

- **Run-of-river (RoR) water rights:**
 - Authorized
 - **636,750** ac-ft/yr total diversion
 - diversion locations in Colorado, Wharton & Matagorda Counties
 - priority dates: 1900 to 1987
 - **Currently used for irrigation**
 - **Availability varies annually**
 - Currently NO environmental flow requirements

Highland Lakes History

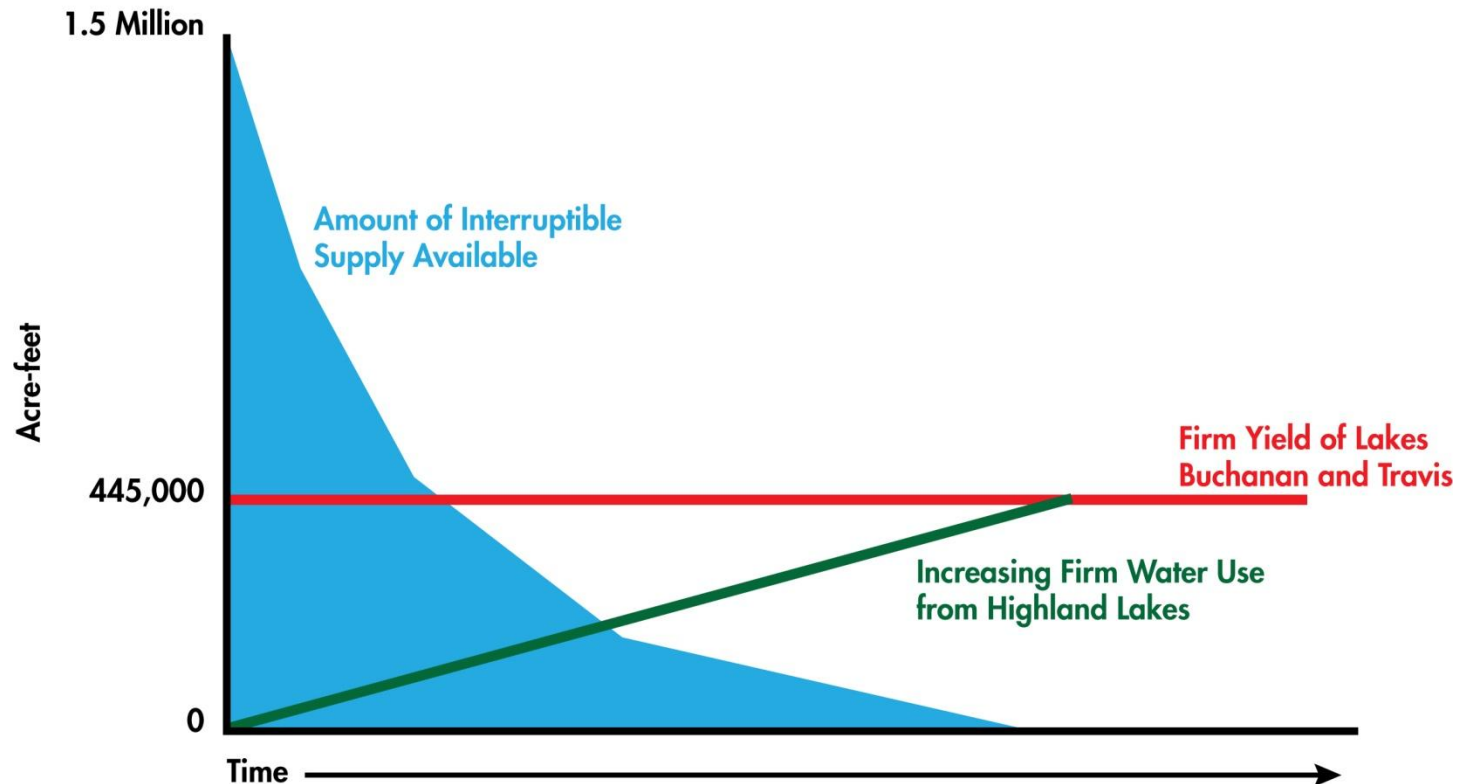
- Storage Right Priority 1926
- Diversion Right Priority 1938
- Adjudication of Water Rights - 1986
- Settlement Agreement – 1987
- Other Agreements/Settlements with both Upstream and Downstream Water Right holders at different times



Water Supply Resource Plan

Firm and Interruptible Water Supply Concept

Firm
versus
Interruptible
Supply
Availability in
lakes
Buchanan
and Travis



As firm water use increases on the Highland Lakes over time,
availability of interruptible water will decrease.

Highland Lakes Water Supply

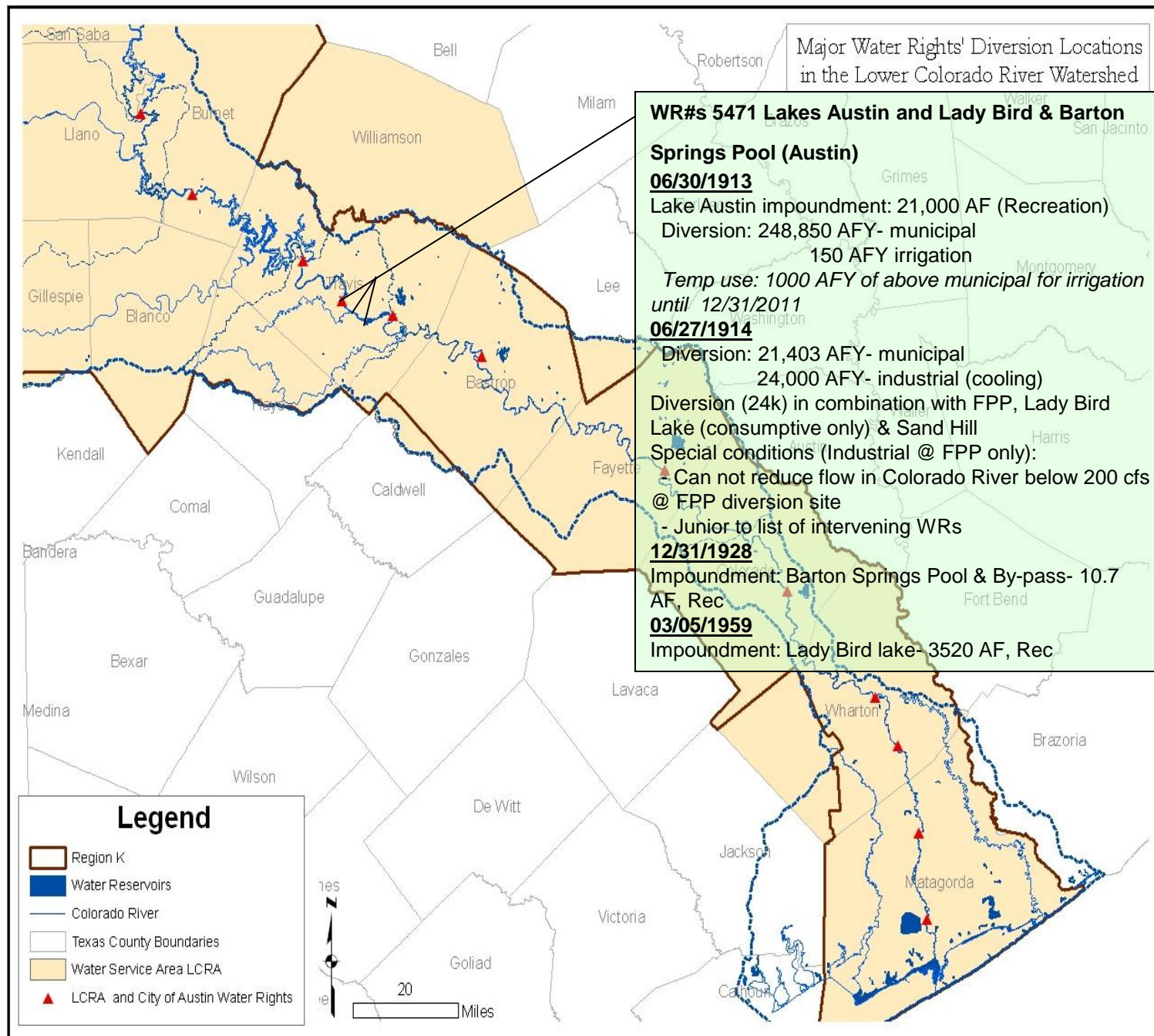
How is water being used?

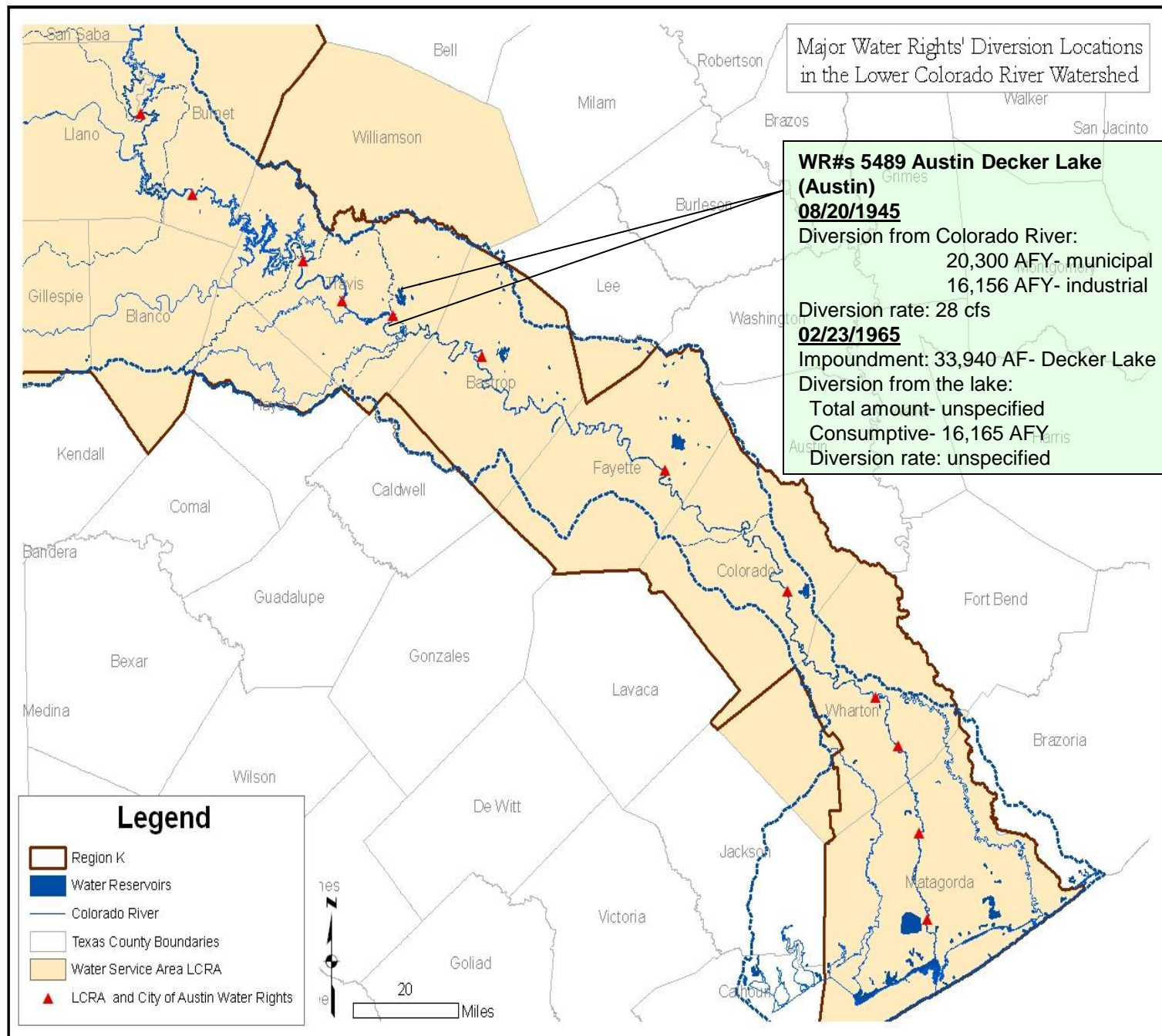
- **Firm Supply of the Lakes = 445,300 ac-ft/yr**
- **LCRA's Firm Supply**
 - **Contracts with entities for M&I needs**
 - Sole source and back-up existing rights
 - **LCRA's own M&I needs**
 - Municipal and Power Plants – Ferguson, Sim Gideon-Lost Pines & FPP
 - **Environmental needs**
- **Interruptible Supply**
 - **For the four major irrigation operations– to supplement the RoR supply**
 - annual contracts
 - price per acre-foot significantly lower than the Firm water price
 - **For environmental needs**

Environmental Flow Needs

- Instream Flow Needs for the Lower Colorado River
 - multiple locations d/s of Lake Travis
 - Critical & Target
 - Daily
- Freshwater Inflow needs for Bays and Estuaries of Matagorda Bay
 - Critical & Target
 - Monthly
- Various criteria/policies
 - for meeting environmental needs
 - apply “flows in the river” first to meet the needs
 - firm & interruptible supply used







Chronology

Major Events

- 1960 Gulf Coast Water Right Acquired
- 1976 STP Settlement
- 1983 Lakeside Water Right Acquired
- 1985 LCRA/CRMWD Stacy Reservoir Agreement
- 1987 Water Rights Adjudicated
- 1989 First Water Management Plan Approved
- 1991 Instream Use Study
- 1992 Water Management Plan First Amendment Approved
- 1993 Pierce Ranch Water Right Acquired (partial)
- 1997
 - Freshwater Inflow Needs Study (FINS)
 - Corpus Christi purchased 35,000 acre-feet of the Garwood water right
- 1999
 - Water Management Plan Second Amendment Approved
 - Garwood Water Right Acquired
 - Contract with the City of Austin
 - Flood Flow Permit Application Submitted
- 2000 Remainder Pierce Water Right Acquired
- 2001 First Region K Water Plan Completed
- 2003
 - San Antonio Water System Feasibility Study Begins
 - Water Management Plan Third Amendment submitted to TCEQ
- 2006
 - Second Region K Water Plan Completed
 - Freshwater Inflows Needs Update Completed
 - STPNOC Settlement
- 2007 Austin Bed & Banks and Supplemental Water Supply agreements